PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	Group Art Unit: 3622
SRINIVASAN, et al.	Examiner: ALVAREZ, RAQUEL
Serial No.: 10/001,662	
Filed: October 18, 2001	
Confirmation No. 4124	
Atty. File No.: 1585C (42059-01380)	
For: "METHOD AND APPARATUS FOR BROADCASTING INFORMATION OVER A NETWORK"	

APPELLANTS' BRIEF ON APPEAL

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Dear Sir:

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A. A copy of U.S. Patent No. 6,006,265 issued to Rangan.

B. A copy of U.S. Patent No. 5,155,591 issued to Wachob.

I. REAL PARTY IN INTEREST

The inventor of the above-noted patent application has assigned all respective rights in relation to the invention entitled "METHOD AND APPARATUS FOR BROADCASTING INFORMATION OVER A NETWORK" including any resulting patent, to U.S. West, Inc., a Delaware corporation formerly with a place of business in Denver, Colorado. This assignment was for the parent U.S. Patent Application No.09/322,375 (Now U.S. Patent No. 6,411,992 issued June 25, 2002) of the above noted patent application (i.e., a continuation patent application) and was recorded at the U.S. Patent Office on Aug. 27, 1999 at Reel 010196, Frame 0922. This invention, including any resulting patent, was then assigned by U.S. West, Inc. to Qwest Communications International Inc., a Delaware corporation with a place of business in Denver, Colorado, in the Assignment that was recorded at the U.S. Patent Office on September 25, 2000 at Reel 010814, Frame 0339. These assignments were subsequently recorded for the above noted patent application at the U.S. Patent Office on Jan. 2, 2007 at Reel 018698, Frame 0929 and at Reel 018698, Frame 0949. Therefore, Qwest Communications International Inc. is the real party in interest in this appeal.

II. RELATED APPEALS AND INTERFERENCES

Appellant, Appellant's legal representative, the assignee of the above-noted patent application, and the named inventors for the above-noted patent application are all unaware of any appeal(s) or interference(s) which will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

The status of the claims is as follows:

1. Claims cancelled: 7, and 12 – 21;
2. Claims pending: 1 – 6, 8 – 11 and 22 – 25;
3. Claims rejected: 1 – 6, 8 – 11 and 22 – 25; and
4. Claims appealed: 1 – 6, 8 – 11 and 22 – 25.

IV. STATUS OF AMENDMENTS (37 CFR § 1.192(c)(4))

The Applicant filed U.S. Patent Application No. 10/001,662 on Oct. 18, 2001. The application contained 21 total claims, 2 of which (Claims 1 and 12) were independent claims. The Applicant received a Non Final Office Action mailed Jan. 29, 2003 (the "First Non Final Office Action"), wherein Claims 1 – 11 were rejected by the original Examiner under 35 U.S.C. § 101. Claims 1 – 21 were also rejected under 35 U.S.C. § 112, first paragraph and second paragraph. Claims 1 through 21 were also rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,331,974 (issued May 25, 1982), U.S. Patent No. 5,155,591 (issued Oct. 13, 1992; hereafter "Wachob"), U.S. Patent No. 5,446,919 (issued Aug. 29, 1995), U.S. Patent No. 5,515,098 (issued May 7, 1996), U.S. Patent No. 5,661,516 (issued August 26, 1997); or U.S. Patent No. 5,600,364 (issued Feb. 4, 1997) and under 35 U.S.C. § 102(e) as being anticipated by WO 99/46708 (published September 16, 1999), U.S. Patent No. 6,006,265 (issued Dec. 21, 1999; hereafter "Rangan"), WO 00/17775 (published Mar. 30, 2000), or U.S. Patent No. 6,298,348 (issued Oct. 2, 2001). Claims 1 – 21 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over the Examiner's personal experience in NFL Super Bowl advertising. The Applicant filed an Amendment and Response on June 30, 2003 amending claims 1, 2, 4, 8, 9, 11 – 14, 17, and 18, cancelling claims 7 and 20 to address informalities, and arguing the distinctions in the claims as compared to the above cited references.

The Applicant received a Final Office Action mailed on August 25, 2003 (the "First Final Office Action") rejecting claims 2, 10, and 15 for various informalities and rejecting claims 1 – 6, 8 – 11, 13 through 19, and 21 under 35 USC § 101 for previously recited reasons. The Examiner also maintained the rejections of claims 1 – 6, 8 – 19, and 21 under 35 U.S.C. § 112, first paragraph and second paragraph, 35 U.S.C. § 102, and 35 U.S.C. § 103(a). The Applicant filed a Request for

Continued Examination and a Preliminary Amendment therewith on October 24, 2003 amending claims 1, 3 – 6, canceling claims 12 – 21, and adding new claims 22 – 25. On January 18, 2006, newly assigned Examiner Raquel Alvarez mailed a Non Final Office Action (the "Second Non Final Office Action") rejecting claims 1 – 6 and 8 – 25 (even though claims 12 – 21 were already cancelled) under 35 USC § 103(a) as being unpatentable over Rangan, et al. in view of Wachob, although claims 8 – 21 were no longer pending. The Applicant amended claims 1 and 6 to correct informalities on May 18, 2006 and traversed each of the Examiner's rejections including those which the Examiner never articulated. In a Final Office Action mailed August 11, 2006 (the "Second Final Office Action"), the Examiner maintained the rejections to claims 1 – 6 and 8 – 25 under 35 U.S.C. § 103(a) and summarily dismissed the Applicant's arguments and the Applicant's contentions that she did not address the claims. The Applicant responded to the Second Final Office Action on October 11, 2006, traversing the Examiner's rejections to claims 1 – 6, 8 – 11, and 22 – 25 without amending. In response, the Examiner mailed an Advisory Action on October 20, 2006 stating that the application was still not in condition for allowance. A Notice of Appeal was filed by the Applicant on November 13, 1006 and this Appeal Brief is the result thereof.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1

Generally, claim 1 of the present invention relates to transmitting digital media from a network server over a data network while providing the ability to determine demographic information of a user who receives the digital media such that commercial content can be inserted into the digital media according to the demographic information. *See e.g.*, page 9, lines 7 – 10 of the present application. In accordance with claim 1, a system user logged into a network server may be detected. *See, e.g.*, page 15, lines 21 – 23 of the present application. The user may be connected to the network from a remotely located computer. *See, e.g.*, page 7, lines 14 – 15 of the present application. One or more hypertext links may be presented, such that the system user may choose to view a particular multimedia presentation by selecting a hypertext link. *See e.g.*, page 16, lines 5 – 7 of the present application. The chosen multimedia presentation may then be retrieved from a database or external source and transmitted to the user's remotely located computer via the data network. *See, e.g.*, Figure 1 and page 7, line 9 through page 8, line 2. The user's IP address may be identified and used to retrieve demographic information pertaining to the user (e.g., the IP address may be representative of a particular user(s) on the Internet fitting a certain demographic profile). *See e.g.*, page 15, lines 13 – 18 and page 19, lines 16 – 22 of the present application. Based on the demographic information, a commercial can then be selected from a commercial database for insertion into the chosen multimedia presentation during a commercial break. *See e.g.*, page 16, lines 3 – 23 and page 19, lines 8 – 15 of the present application. When the commercial break is detected during transmission of the multimedia presentation over the data network, the selected commercial may be retrieved from a commercial database and transmitted to the system user. *See, e.g.*, page 16, lines 10 – 14 of the present application. The demographic information may be acquired from the system user through a screen display (e.g., an Internet user may enter

demographic information through a web browser). *See, e.g.*, page 7, lines 14-19; page 9, lines 7 – 10; and page 15, line 21, to page 16, line 2, of the present application.

Claim 2

Additionally, the invention relates to the simultaneous delivery of different commercials to various viewers of the same show during a broadcast. *See generally*, page 16, lines 3-19. For example, in accordance with claim 2, multiple system users logged into a broadcast server over a network may be detected and identified so that each user's demographic information may be retrieved from a database. *See e.g.*, page 15, lines 21 – 23 of the present application. A number of commercials may be retrieved, each of which is associated with the demographic information of at least one of the system users. *See, e.g.*, page 16, lines 14-19. Multimedia information may be broadcast from the server over the data network to the system users. *See e.g.*, page 16, lines 3 – 7 of the present application. During a commercial break detected in the multimedia broadcast, the commercials may be delivered simultaneously to different users based on the demographic information. *See e.g.*, page 19, lines 12 – 14 and page 11, line 18 through page 12, line 3 of the present application.

Claim 4

In accordance with claim 4, the invention may further include monitoring system users to accumulate additional demographic information, such as age of the user, sex of the user, and geographic location of the user. *See e.g.*, page 9, lines 7 – 10; Figure 10; and page 15, lines 10-18 of the present application.

Claim 5

Additionally, the invention includes inserting commercials into ad hoc commercial breaks, such as may occur at unpredictable times during the broadcast of a sporting event. In accordance

with claim 5, the occurrence of an ad hoc commercial break may be detected. *See e.g.,* Figure 22 and page 18, line 20, to page 19, line 2 of the present application.

Claim 9

In accordance with claim 9, the invention may also include querying a system user for demographic information when the user logs into the network server. *See e.g.,* page 9, lines 20 – 25 of the present application.

Claim 11

In accordance with claim 11, identification of a user may be performed by reading the IP address of the user and/or by reading a login ID of the user. *See e.g.,* page 15, lines 10 – 16 of the present application.

Independent Claim 22

Generally, independent claim 22 of the present invention relates to a system that provides for the transmission of multimedia information over a data network (e.g., World Wide Web of page 2, lines 15 – 16 of the present application). For example, in accordance with claim 22, a network server may be used for transmitting digital media from a over a data network while providing the ability to determine demographic information of a user who receives the digital media such that commercial content can be inserted into the digital media according to the demographic information. *See e.g.*, page 9, lines 7 – 10 of the present application. More specifically, the network server includes a network interface that establishes connections with system users over the data network. *See e.g.*, page 7, lines 14 – 22 of the present application. The network server also includes a schedule database which stores multimedia schedules and screen displays that are presentable to system users for entering demographic information. *See e.g.*, page 9, lines 2 – 4 of the present application. The network server also includes a program source, such as a broadcaster broadcasting television programs or a database for maintaining multimedia information. *See e.g.*,

Figure 1 and page 7, line 19, to page 8, line 2 of the present application. The network server also includes a commercial database for storing commercials that may be transmitted to users based on the demographic information. *See e.g.*, page 12, lines 8 – 11 of the present application. The network server also includes a processor configured to retrieve multimedia information based on the schedules for transmission to users through the network interface. The processor is also configured to select and transmit commercials based on the demographic information. *See e.g.*, page 8, line 16 – page 9, line 11 of the present application. For example, the processor may transmit different commercials to different users at the same time depending on demographic information associated with each commercial and user. *See, e.g.*, page 11, line 18 – page 12, line 3 of the present application.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1 – 6, 8 – 11, and 22 – 25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Rangan (i.e., U.S. Patent No. 6,006,265) in view of Wachob (i.e., U.S. Patent No. 5,155,591).

VII. ARGUMENTS

The Examiner rejected claims 1 – 6, 8 – 11, and 22 – 25 under 35 U.S.C. § 103(a) as being unpatentable over Rangan in view of Wachob, in the Second Non Final Office Action mailed January 18, 2006 without addressing all of the claims. In the Second Non Final Office Action, the Examiner merely argued how Rangan and Wachob obviate certain limitations in the independent claims (i.e., claims 1 and 22). When the Applicant brought this failure to address all of the claims to the Examiner's attention, the Examiner issued a Final Office Action simply stating that all claim limitations were addressed in the Non Final Office Action mailed on May 22, 2006. The Examiner's communication on May 22, 2006, however, was an interview summary in which no rejections were discussed. The Applicant considered the Examiner's assertion as meaning that all claim limitations were addressed in the Second Non Final Office Action with a mailing date of January 18, 2006. However, the Applicant maintains that the Examiner merely rejected all claims and only addressed claim limitations associated with claims 1 and 22 and did not even address each independent claim element correctly. That is, the Examiner did not point out where all of the claim elements of claims 1 and 22 are taught.

Claim 1

As one example of the Examiner's erroneous rejection, the Examiner rejected claim 1 by stating that Rangan, at column 20, lines 52 – 60, teaches the claimed steps of receiving through a screen display demographic information for the system user and using the IP address to access a database and retrieve demographic information that is associated with the system user. However, Rangan instead merely states that a client subscriber/user/viewer (SUV) may click to a hyper video commercial to initiate a Web transaction (column 20, lines 49 and 50 of Rangan) and that the feedback from the transaction results in on-the-fly commercial insertion that may be tuned to local demographic conditions and user profiles. Nowhere does Rangan state that demographic

information for a system user is received through a screen display. In fact, Rangan does not mention or even suggest a screen display for entering demographic information in any form.

The claimed display allows the user to enter demographic information so that preferable commercials may be inserted into the multimedia presentation. The demographic information of the Applicant's claims originates from system users who have logged on and provided certain demographic information about themselves. This information is stored within a database which allows the programmer to ascertain a particular audience according to the demographic information and subsequently select commercials that are based on that demographic information. *See e.g.*, page 9, lines 5 – 24, page 10, lines 1 – 19 of the present specification. Rangan, on the other hand, teaches the automatic analysis of streaming video and the insertion of hotspots over hyperlinks to make hypervideo. Column 17, lines 49 – 53 of Rangan. While Rangan is certainly a challenging reference to comprehend, the Applicant finds no teaching or reasonable suggestion regarding the entrance of demographic information through a screen display as the Applicant claims.

Regardless, Rangan's mere statement of commercial insertion in column 20, line 55 is not the same as the commercial transmission of a retrieved commercial during a commercial break. Rather, Rangan's alleged teaching of a commercial insertion generally regards insertion of hypertext links within video content to make "hypervideo", which allows a user to select additional video content during presentation of the hypervideo. For example, Rangan explicitly states that "in accordance with the present invention, the insertion is not of clips… but rather of hyperlinks", column 20, lines 15 – 22. The specification of Rangan is fraught with explicit references stating that insertion is in the context of hyperlinks that are associated with commercials. *See e.g.*, column 18, lines 51 – 59. This differs from the Applicant's claims because, among other reasons, the Applicant claims the insertion of commercials based on demographic information as opposed to the insertion of hyperlinks.

Additionally, the Examiner cited *In re Keller*, 642 F.2d 413 (C.C.P.A. 1981), stating that the Applicant argues against the references individually and that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. The Examiner's understanding of *In re Keller* is fundamentally wrong. *In re Keller* does relate to an applicant's arguments in favor of patentability over an obviousness rejection (i.e., § 103(a)) based on a combination of references, as in the present application. However, *In re Keller* showed that the applicant stipulated that every element of the applicant's claims was taught by the combined references. The applicant in that case chose to argue that the cited references were not combinable because they were not analogous. More specifically, the *Keller* applicant argued that a secondary reference, which included one claim element (i.e., a digital timing circuit) within a teaching of mammalian heart stimulation, was not combinable with a primary reference, which included all of the applicant's claim elements except for a digital timing circuit within a teaching of cardiac pacing. The applicant there still claimed an analog timing circuit that was easily replaceable with the digital timing circuit of the secondary reference. This differs from the present case because the Applicant here is only stating other features that the primary reference does not teach. In other words, the cited references do not teach all of the Applicant's claim elements as required and as the Applicant maintains.

To illustrate, the Examiner stated that Rangan teaches the Applicant's element of receiving through a screen display demographic information for the system user and using the IP address to access a database and retrieve demographic information that is associated with the system user. The Applicant pointed out that Rangan does no such thing. Rangan does not teach receiving demographic information through a screen display. The Applicant then pointed out what one skilled in the art would understand Rangan to be teaching, to illustrate the differences between what the Examiner asserted and what the Applicant claims. Thus, the Applicant has shown that Rangan

does not teach all of the Applicant's claim elements as the Examiner suggests. As is well known, "all elements of the claim must be found in the reference." *In re Royka*, 490 F.2d 981 (C.C.P.A. 1974). *See also*, M.P.E.P. § 2143.03.

The Examiner also stated that Rangan does not specifically teach detecting a commercial break but that Wachob does. The Applicant agrees that Rangan does not teach detecting a commercial break; but neither does Wachob. The Examiner pointed to Figure 3 of Wachob to state that Wachob teaches detecting a commercial break. In Figure 3, Wachob teaches reading tag information that is transmitted by the system head (box 150). For example, Wachob states that "[t]he tag information defines if and when a commercial is about to occur, how long it will last, and which channel the converter should tune to." Column 7, lines 13-21 of Wachob. Nothing in this reference suggests detection; rather, the information is provided by the headend.

Regardless, Wachob is not analogous art. Rangan teaches selection of hypertext links within video content for distribution over the Internet. Wachob teaches commercial insertion during predetermined times via cable television (*see e.g.*, column 4, lines 30-35 of Wachob). The types of content are totally different. That is, Rangan delivers audio and/or video content digitally via Internet protocols through an Internet network (*see e.g.*, Figure 1 and column 24, lines 32 – 51 of Rangan), whereas Wachob delivers audio and/or video content in an analog fashion via radio frequency AM or FM modulation schemes (*see e.g.*, Figure 1 and column 4, lines 56 – 68 and column 1 – 7 of Wachob). Such analysis is inconsistent with the reasonableness standard stated in *In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992) (stating "it is necessary to consider the 'reality of the circumstances' – in other words, common sense – in deciding in which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor"). *See also* MPEP § 2141.01(a).

Even if the two references were combinable, there is simply no motivation to combine. For example, Wachob is specifically related to delivering content to a cable television user via the converter (a.k.a. a set-top-box) of Figure 1 in conjunction with the remote control of Figure 2. Rangan does not teach or reasonably suggest the use of such boxes because all of Rangan's communications are performed via computers through the Internet. Additionally, there has to be some reasonable expectation of success in the combination. *See In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). *See also* M.P.E.P. § 2143.02. There is no reasonable expectation of success because one cannot simply "jam" analog content through the internet by means of an analog cable TV box. Reasonableness aside, there is simply no way to combine Rangan and Wachob and expect the combination to work because Rangan is directed to the Internet and Wachob is directed to conventional television – two vastly different forms of communication. Rangan even expresses this fact, at column 29, lines 39 – 42, where it states that its teachings are "in marked contrast to conventional broadcast television where there is no interactivity with the viewer and/or the viewers video playback, especially including commercials."

Because neither Rangan nor Wachob teach or reasonably suggest all of the Applicant's claim elements either alone or in combination, and because Rangan and Wachob are not combinable, the Applicant maintains that claim 1 is novel and non obvious in view of the cited references.

Claims 2-3, 5-6, 8, and 10

Other examples of the Examiner's shoddy examination are found in the rejections of claims 2 – 6 and 8 – 11. For example, in the Second Non Final Office Action, the Examiner never addressed the broadcasting multimedia information of claim 2, the monitoring of system users of claim 4 (argued separately below), the querying of system users of claim 9 (argued separately below), the presenting of an interactive component of claim 10, or the reading of an IP address of

claim 11 (argued separately below). These dependent claims were simply lumped together in the rejections of the associated independent claim 1 without these limitations ever being addressed. Claims should never be grouped together in a common rejection, unless that rejection is equally applicable to all claims in the group. M.P.E.P § 707.07(d). The Applicant maintains that the rejection clearly cannot apply to all of the claims because the elements of the dependent claims recite unique features that are not recited in the patentable independent claim. The Examiner should have issued another non-final office action to address these claims as the Applicant requested. Instead, the Examiner only addressed these limitations in the Second Final Office Action and applied similarly incorrect logic in the rejections thereof. Because claims 2-3, 5-6, 8, and 10 each include all of the limitations of claim 1 and more, Applicant submits that these claims are allowable for at least the same reasons as claim 1 and respectfully requests such disposition.

Claim 4

The Applicant maintains that Rangan does not teach monitoring a system user's computer to accumulate demographic information as claimed by the Applicant in claim 4. In fact, Rangan explicitly teaches away from this claim limitation when Rangan states "[t]his knowledge is not gained by any sort of insidious monitoring of the Client SUVs. Instead, it should be recognized that the Client SUVs from time to time identify, and link, to the (hyper)video that each wishes to view." Column 18, lines 7 – 11 of Rangan. For the first time in the Second Final Office Action, the Examiner stated that Rangan does teach monitoring a system user's computer to accumulate demographic information at column 29, lines 35 – 39. Here, Rangan states that an advertiser may develop statistics on "click-throughs." A click-through, as is known to those skilled in the art, is obtained from users who "click" on a web page. Such is analogous to ***monitoring your own website*** to determine how many other people "click" on your website. This, however, does not

constitute ***monitoring another person's computer*** as the Applicant claims. For at least these reasons, claim 4 is allowable and such disposition is respectfully requested.

Claim 5

As Examiner has pointed out, Rangan does not teach detecting a commercial break; but, neither does Wachob. In claim 5, the Applicant claims an ad hoc commercial break. The ad hoc commercial break of the Applicant's claims is a type of commercial which may be shown during a program which has a number of nondesignated commercial breaks (e.g., sporting events with unpredictable timeouts). Page 10, lines 15 – 19 of the present application. The Applicant has already shown that Wachob does not teach detection of a commercial break. As such, Wachob cannot teach detection of an ad hoc commercial break. In fact, Wachob has no teaching or reasonable suggestion regarding any type of unpredictable commercial break detection. Since Wachob does not teach or reasonably suggest an ad hoc commercial break detection and since Rangan admittedly does not, claim 5 must be allowable and such disposition is respectfully requested.

Claim 9

Claim 9 recites a step of querying a system user to provide the demographic information when the system user logs on to the network server. Neither Rangan nor Wachob teach or reasonably suggest querying a user for demographic information when the system user logs on to the network server as the Applicant claims in claim 9. Rather, Rangan only states that demographic information is used without making reference to how the information is acquired. Wachob, on the other hand, states that information is provided by means of a remote control or "household survey" (*see e.g.*, column 1, lines 48 – 64 of Wachob) without teaching or reasonably suggesting any type of querying of a system user being performed by the network, particularly when the system user logs on to the network. That is, Wachob's users input data to a system without regard to any query.

Since Rangan and Wachob neither teach nor reasonably suggest querying of the system user for demographic information when the system user logs on, the cited references are simply insufficient in nullifying the patentable features of the Applicant's claim. For at least these reasons, claim 9 is allowable in view of the cited references and the Applicant, therefore, respectfully requests such disposition.

Claim 11

Rangan and Wachob also do not teach or reasonably suggest receiving a login ID from a system user, either alone or in combination, as the Applicant claims in claim 11. In fact, Wachob is essentially precluded from doing so because the non-analogous art of Wachob is directed towards cable television and not the network servers associated with the Internet of the Applicant's claims (e.g., cable television users do not log on to their set top boxes). The Examiner first addressed this claim in the Second Final Office Action nakedly arguing that Rangan teaches a login. The Applicant has made a thorough search of Rangan and finds no such teaching or even any form of the word "log". Since neither Rangan nor Wachob teach or reasonably suggest receiving a login ID as the Applicant claims, claim 11 is allowable in view of these references in such disposition is respectfully requested.

Claims 22-25

Claims 22-25 relate to a network server for use in transmitting multimedia information and commercials over a data network to users who enter demographic information about themselves. The Examiner rejected claim 22 based on Official Notice, stating that it is old and well known "to schedule when certain information is to be scheduled in order to designate a fixed time for an event." Even if this is true, the Examiner still failed to address where a schedule database stores one or more screen displays which are presentable and through which the system users enter demographic information. Moreover, the Applicant cannot even fully comprehend the Examiner's

rejection because Examiner rejected claim 22 based on Rangan and Wachob. The Applicant maintains that neither Rangan nor Wachob teaches or reasonably suggests such storage. The Applicant further maintains that it is not well known to those skilled in the art to provide a schedule database that stores one or more screen displays which are presentable and through which the system users enter demographic information. Accordingly, the Applicant believes claim 22 is allowable and respectfully requests such disposition.

Regarding the Examiner's Official Notice, it has been held that an Examiner cannot simply "pick and choose" elements to depreciate the claimed invention as such would be hindsight. See *e.g.*, *In re Fine*, 837 F.2d 1071, 1075 (C.A.Fed., 1988); see also, M.P.E.P. § 2143.03. The Applicant pointed out that such a schedule database is not well-known or old and demanded proof of such an assertion. The Examiner stated, however, that the Applicant did not properly challenge the Examiner's official notice and cited "In re Boon" at M.P.E.P. § 2144.03. There is no such citation at M.P.E.P. § 2144.03. Regardless, to adequately traverse "Official Notice", an applicant is required to specifically point out the supposed errors in the Examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well known in the art. M.P.E.P. § 2144.03. The Applicant stated that the claimed scheduling database is used to store data pertaining to scheduling. Storing screen display data in a scheduling database would essentially be storing data other than what a typical database would be originally configured for. Accordingly, the Applicant respectfully requests withdrawal of the Examiner's Official Notice.

As with the dependent claims of claim 1, the Examiner also failed to individually address claims 23 – 25 depending from claim 22. For example, the Examiner never addressed the program source of claim 23 or the simultaneous transmission of claim 24. These dependent claims were lumped together in the rejection of the associated independent claim 22, which the Applicant maintains is impermissible because the rejection is not equally applicable to all claims in the group.

See M.P.E.P § 707.07(d). The Applicant pointed out the Examiner's failure to address each claim in the Second Non Final Office Action and requested a new Non Final Office Action, which the Examiner summarily dismissed. The Applicant maintains that claims 22 – 25 are allowable in view of the cited references and, therefore, respectfully requests such disposition.

VIII. CLAIMS APPENDIX

1. A method of transmitting multimedia from a network server information over a data network comprising the steps of:

detecting at least one system user logged into a network server through a connection established over the data network from a remotely located computer and identifying an IP address associated with the connection of the remotely located computer with the network server, and presenting one or more hypertext links which are selectable so as to view a selected multimedia presentation;

receiving through a screen display demographic information for the at least one system user;

using the IP address to access at least one database to retrieve demographic information stored therein associated with the at least one system user;

based on the selected hypertext link accessing the selected multimedia presentation in a computer memory and transmitting the selected multimedia presentation information from the network server over the connection to the remotely located computer;

detecting an inserted commercial break during the transmission of the multimedia presentation over the connection;

based on the demographic information associated with the at least one system user, accessing a commercial database and retrieving at least one commercial associated with the demographics for the at least one system user; and

transmitting the retrieved commercial to the at least one system user over the connection during the commercial break.

2. The method of claim 1 further comprising the step of:

detecting a plurality of system users logged into the network server over the data network;

identifying each of the plurality of system users connected to the broadcast server and accessing the at least one database to to retrieve demographic information stored in first memory for each of the plurality of system users

broadcasting the multimedia information from the broadcast server over the data network to the plurality of system users;

detecting a commercial break during broadcasting of the multimedia information;

retrieving from memory plurality of commercials, each of which is associated with the demographic information of one of the plurality system users;

during the commercial break, simultaneously broadcasting the plurality of commercials, wherein each of the commercials in the plurality of commercials is broadcast to a system user within the plurality of system users with the demographic information associated with the commercial.

3. The method of claim 1 wherein the multimedia information comprises at least one of: a data stored in memory and a live program received from a remote source.

4. The method of claim 1 further comprising the step of monitoring the at least one system user receiving the multimedia presentation and accumulating additional demographic information for the multimedia presentation.

5. The method of claim 4 wherein the step of detecting a commercial break is performed for ad hoc commercial breaks.

6. The method of claim 1 further comprising the step of identifying one or more appropriate commercials based on the time available during an identified commercial break.

Claim 7 (Cancelled)

8. The method of claim 7 wherein the demographic information includes at least one of: age of the at least one system user, sex of the at least one system user, and geographic location of the at least one system user.

9. The method of claim 1 further comprising the step of querying the least one system user to provide the demographic information when the at least one system user logs onto the network server.

10. The method of claim 1 further including the step of presenting an interactive component in the broadcast of the at least one commercial whereby additional information may be retrieved from the memory based on the at least one system user's response to the interactive component.

11. The method of claim 1 wherein the step of identifying the at least one system user comprises at least one of: reading the I.P. address the at least one system user logged into the network server and receiving a login ID from the at least one system user upon logging into the network server.

Claims 12-21 (Cancelled)

22. A network server configured for transmitting multimedia information over a data network comprising:

a network interface in communication with a data network, said network interface configured to establish one or more connections with systems user connecting with the network server over the data network;

a schedule database within which is stored one or more schedules for the multimedia information as well as one or more screen displays which are presentable and through which the one or more system users enter demographic information;

a program source from which the multimedia information included listed in the one may be retrieved;

a commercial database within which are stored commercials which are transmittable to the at least one system user, wherein each of the commercials is associated with one or types of the demographic information;

a processor in electrical connection the network interface, the schedule database and the program source, wherein the processor is configured to retrieve the multimedia information selected from the one or more schedules, and to transmit the retrieved multimedia information to the system user over the connection established by the system user through the network interface; and

said processor further configured to select one or more commercials associated with the entered demographic information and to transmit the selected commercial with the selected multimedia information.

23. The network server of claim 22 wherein the program source comprises at least one of: a database containing the multimedia information as data files and an external broadcast source.

24. The network server of claim 22 wherein the processor is further configured to transmit a plurality of multimedia information presentations simultaneously to different system users.

25. The network server of claim 22 wherein the data network is the World Wide Web.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.

XI. CONCLUSION

Based upon the foregoing, Appellant respectfully requests the Board to reverse the Examiner's § 103(a) rejections of all pending claims and to pass the above-identified patent application to issuance.

Respectfully submitted,

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Date: March 14, 2007

APPENDIX A

A copy of U.S. Patent No. 6,006,265 to Rangan, et al.

US006006265A

United States Patent [19]

Rangan et al.

[11] Patent Number: 6,006,265

[45] Date of Patent: Dec. 21, 1999

[54] **HYPERLINKS RESOLUTION AT AND BY A SPECIAL NETWORK SERVER IN ORDER TO ENABLE DIVERSE SOPHISTICATED HYPERLINKING UPON A DIGITAL NETWORK**

[75] Inventors: **P. Venkat Rangan; Vijnan Shastri; P. Sriharl Sampath-Kumar; Arya Ashwani**, all of San Diego, Calif.

[73] Assignee: **HOTV, Inc.**, San Diego, Calif.

[21] Appl. No.: **09/054,362**

[22] Filed: **Apr. 2, 1998**

[51] **Int. Cl.**[6] **G06T 1/00**

[52] **U.S. Cl.** **709/226**; 709/229

[58] **Field of Search** 707/502, 501; 345/302, 2, 10, 104; 709/226, 229, 218, 249, 200, 227

[56] **References Cited**

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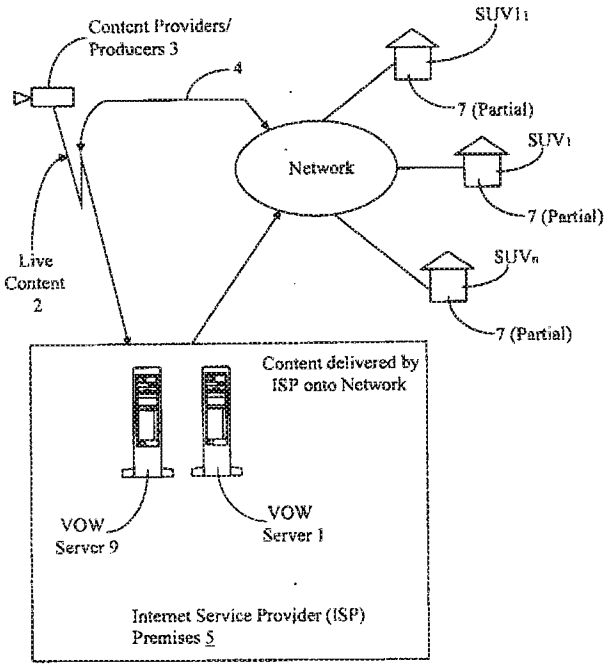
Primary Examiner—Zarni Maung
Assistant Examiner—Khanh Quang Dinh
Attorney, Agent, or Firm—Fuess & Davidenas

[57] **ABSTRACT**

Streaming digital hypervideo including copious embedded hyperlinks is distributed upon a digital communications network from a hypervideo server, normally an Internet Service Provider, to multitudinous client subscribers/users/viewers (client SUVs). Some or all of the client SUVs receive the same hyperlinks at the same place in the streaming hypervideo. Some small fraction of the client SUVs selectively volitionally exercise a fraction of the total hyperlinks, causing an access in the background of the unfolding hypervideo across the digital communications network to yet another server commonly called a "Video On Web server", or "VOW server". The VOW sever interprets each hyperlink request in consideration of (i) the identity of the exercising client SUV and, most commonly, (ii) additional data of a demographic, socioeconomic, credit, viewing preference, security and/or past hyperlinking history nature. The VOW Server supplies each hyperlink-exercising client SUV with a potentially custom hyperlink —normally in the form of a network universal resource locator (URL) or an index to a file of URLs—while keeping track of commercially useful data regarding the client SUV response(s). Each client SUV uses its own associated received URL to retrieve a potentially unique resource. The resource can be internal, such as an executable software program, but is normally located somewhere on the network and is typically in the nature of tailored and/or targeted advertisements, messages of personal or local or temporal pertinence and/or urgency, and/or the results of contests or lotteries. Hypervideo hyperlinks are thus dynamically resolved during streaming network communications to support full custom hyperlinking by each of multitudinous networked client SUVs.

31 Claims, 11 Drawing Sheets



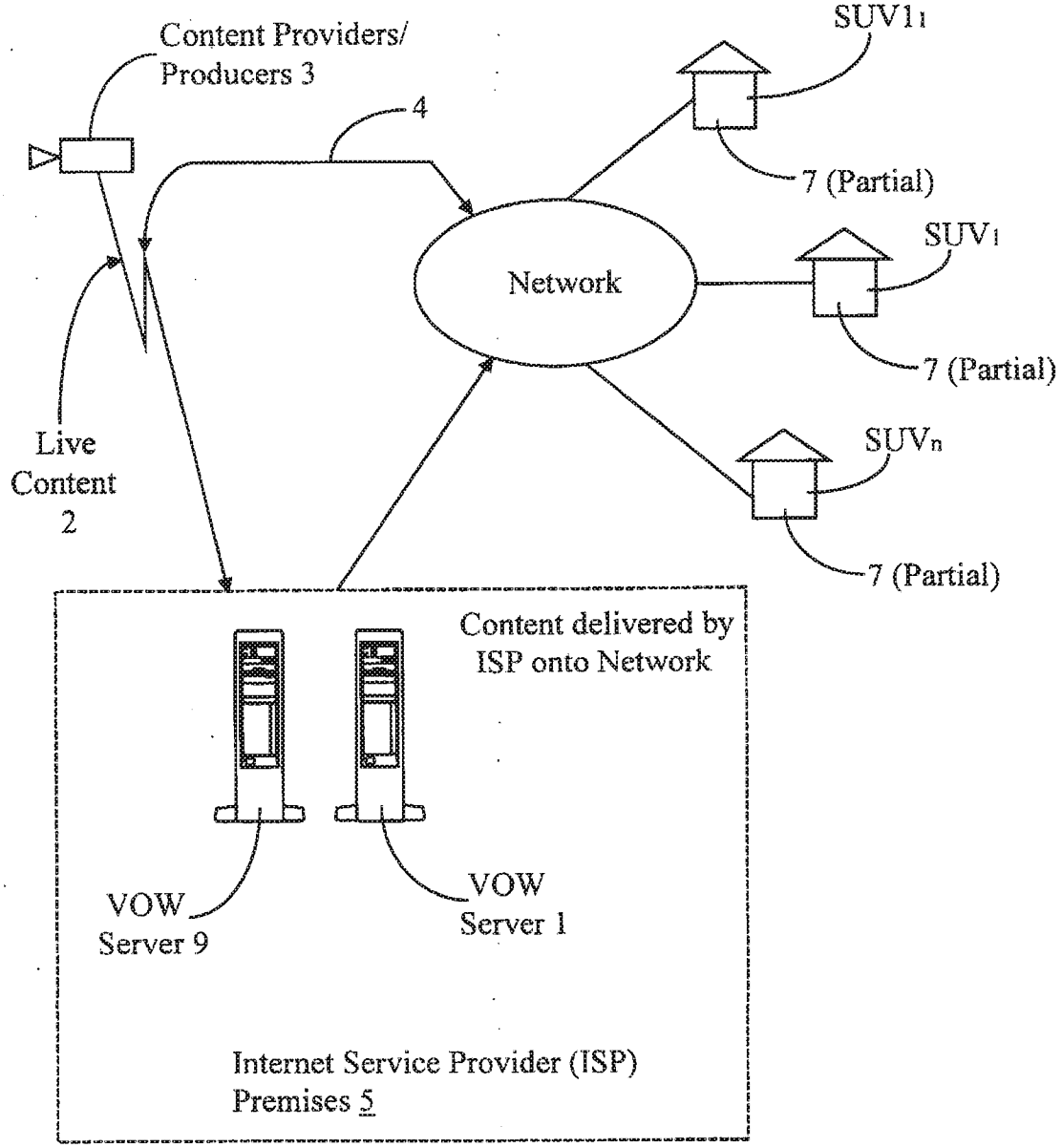

Content Providers/
Producers 3
4
SUV1
7 (Partial)
SUV
Network
7 (Partial)
Live
Content
2
SUVn
7 (Partial)
Content delivered by
ISP onto Network
VOW
Server 9
VOW
Server 1
Internet Service Provider (ISP)
Premises 5

Fig. 1

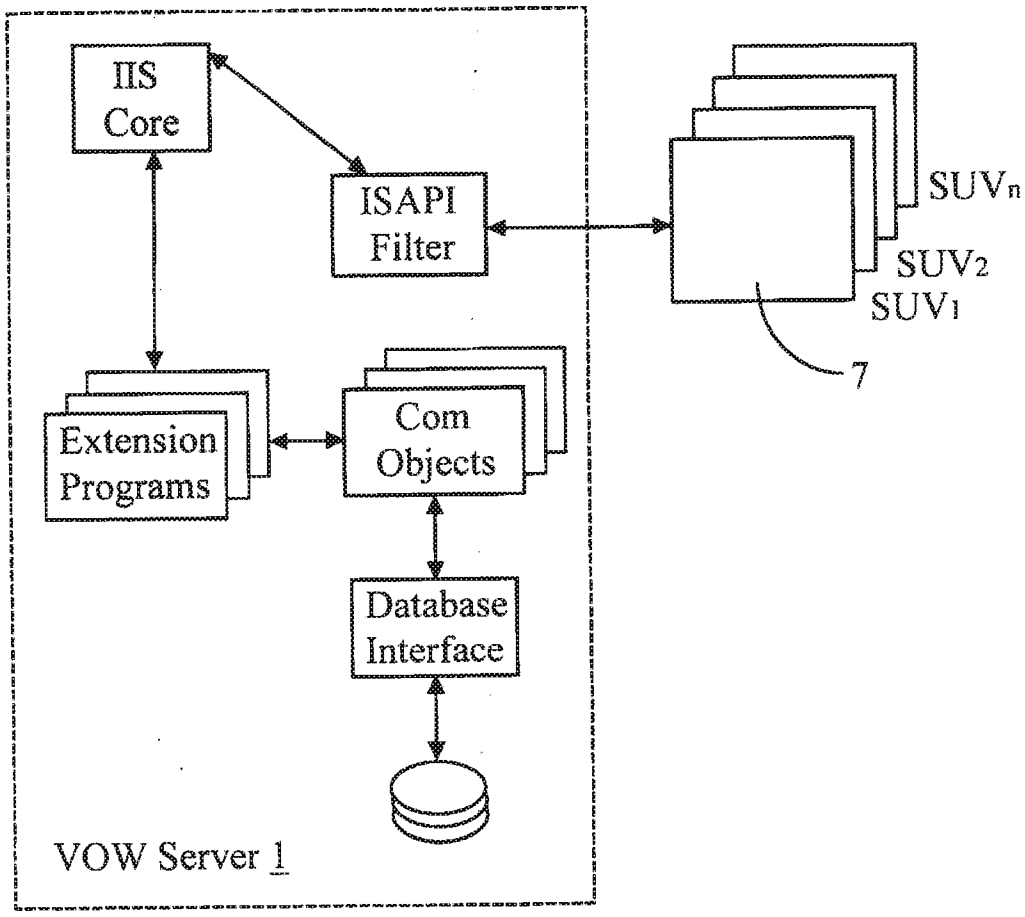

IIS
Core
ISAPI
Filter
SUVn
SUV2
SUV1
7
Extension
Programs
Com
Objects
Database
Interface
VOW Server 1

Fig. 2

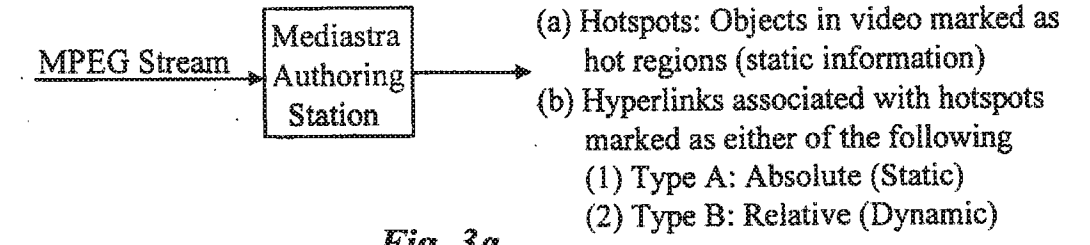


Fig. 3a

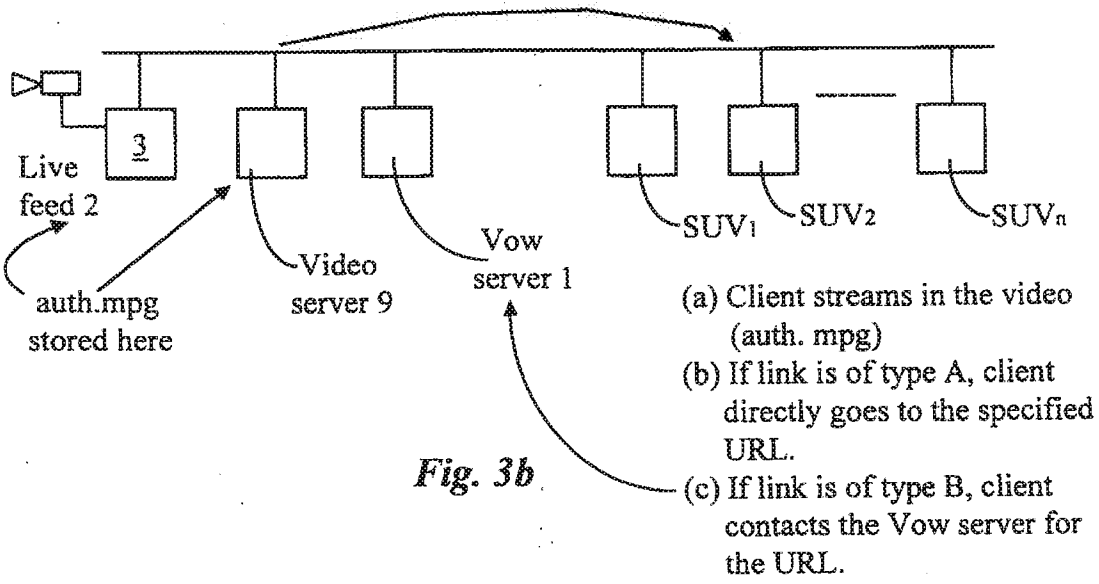


Fig. 3b

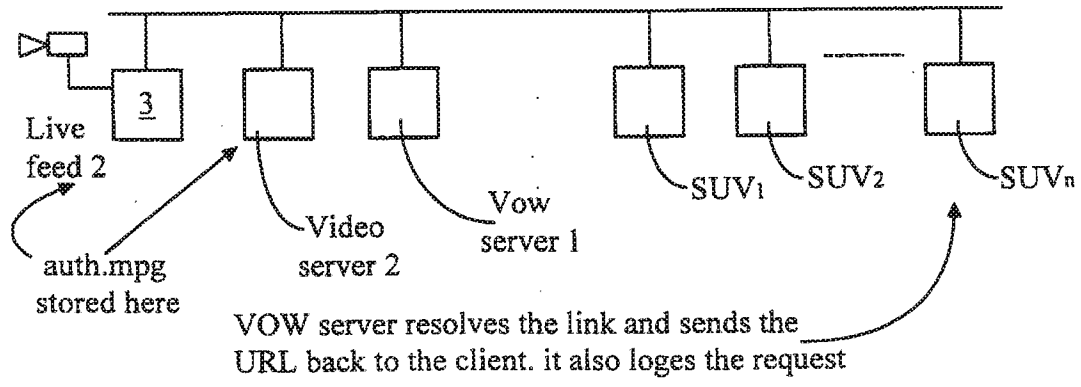


Fig. 3c

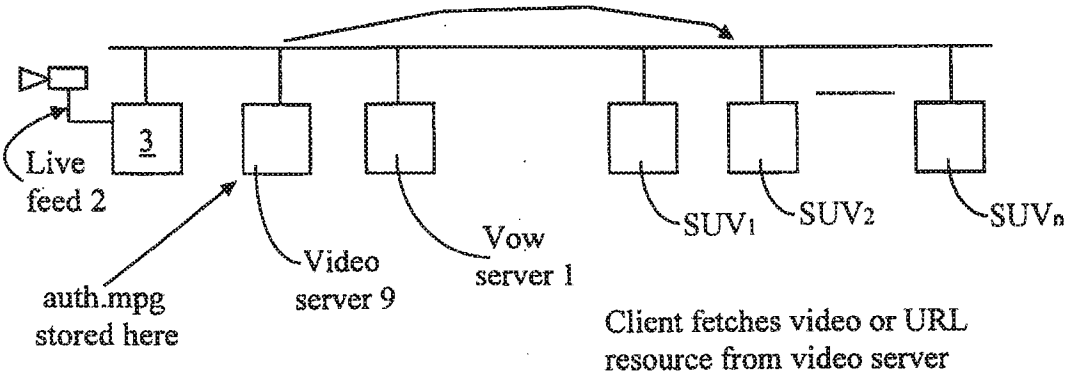

3
Live
feed 2
auth.mpg
stored here
Video
server 9
Vow
server 1
SUV1
SUV2
SUVn
Client fetches video or URL
resource from video server

Fig. 3d

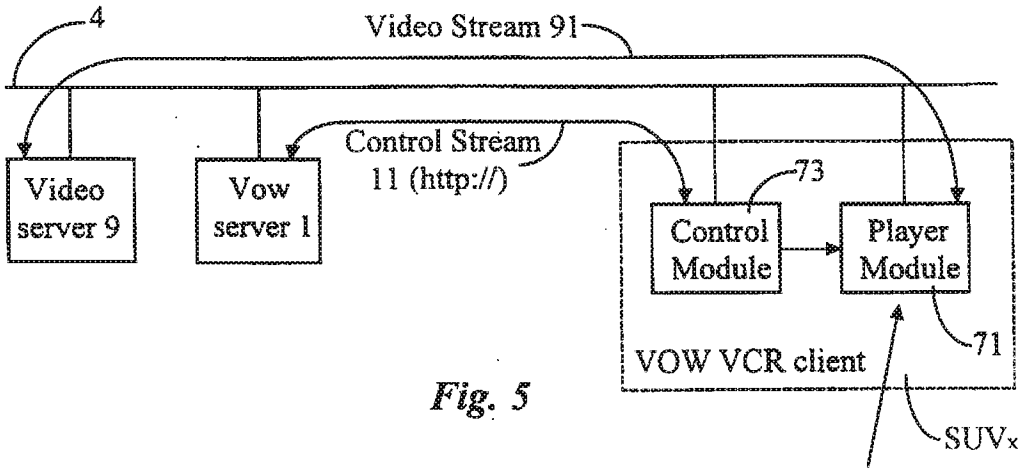

4
Video Stream 91
Control Stream
11 (http://)
Video
server 9
Vow
server 1
73
Control
Module
Player
Module
71
VOW VCR client
SUVx

Fig. 5

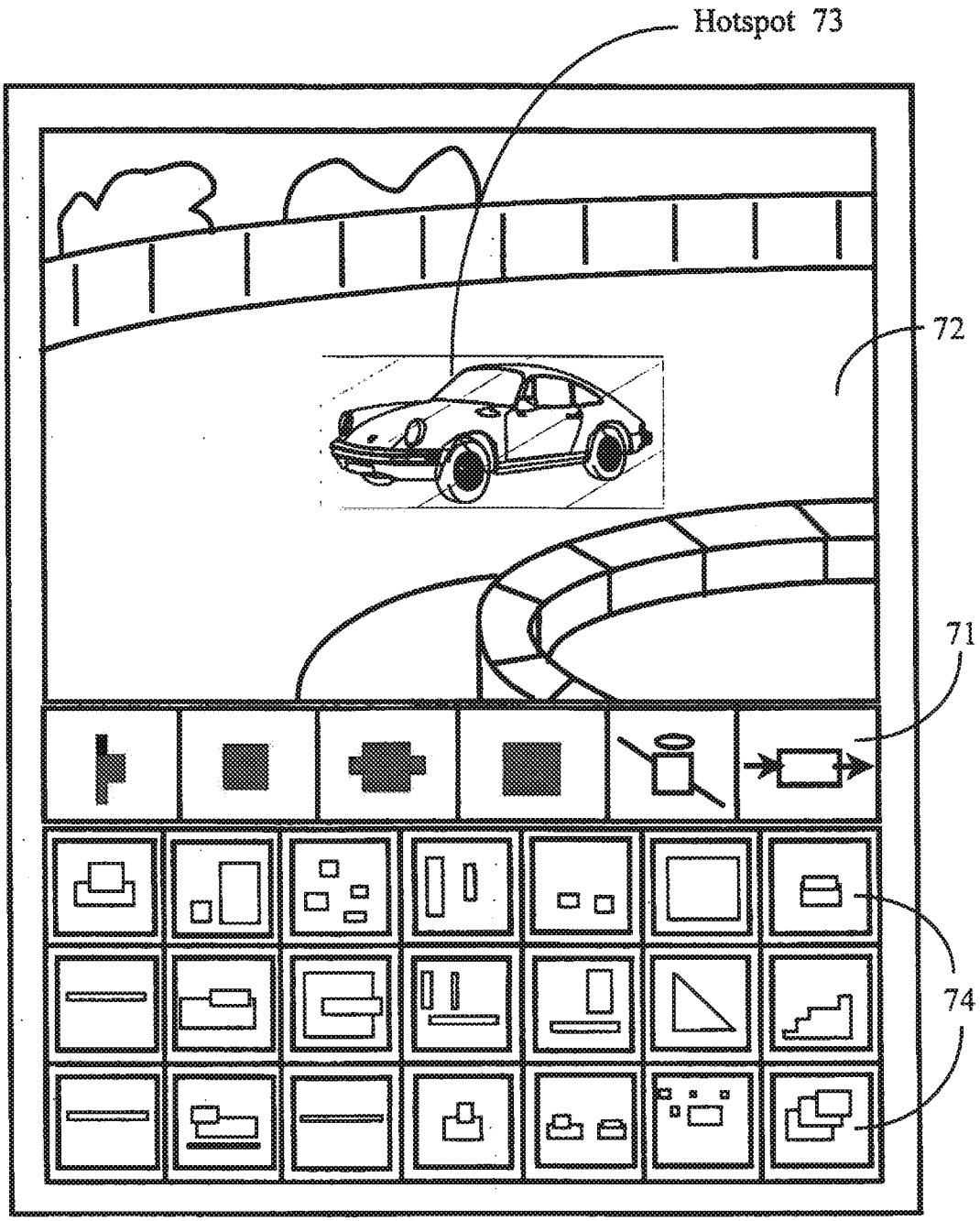


Fig. 4

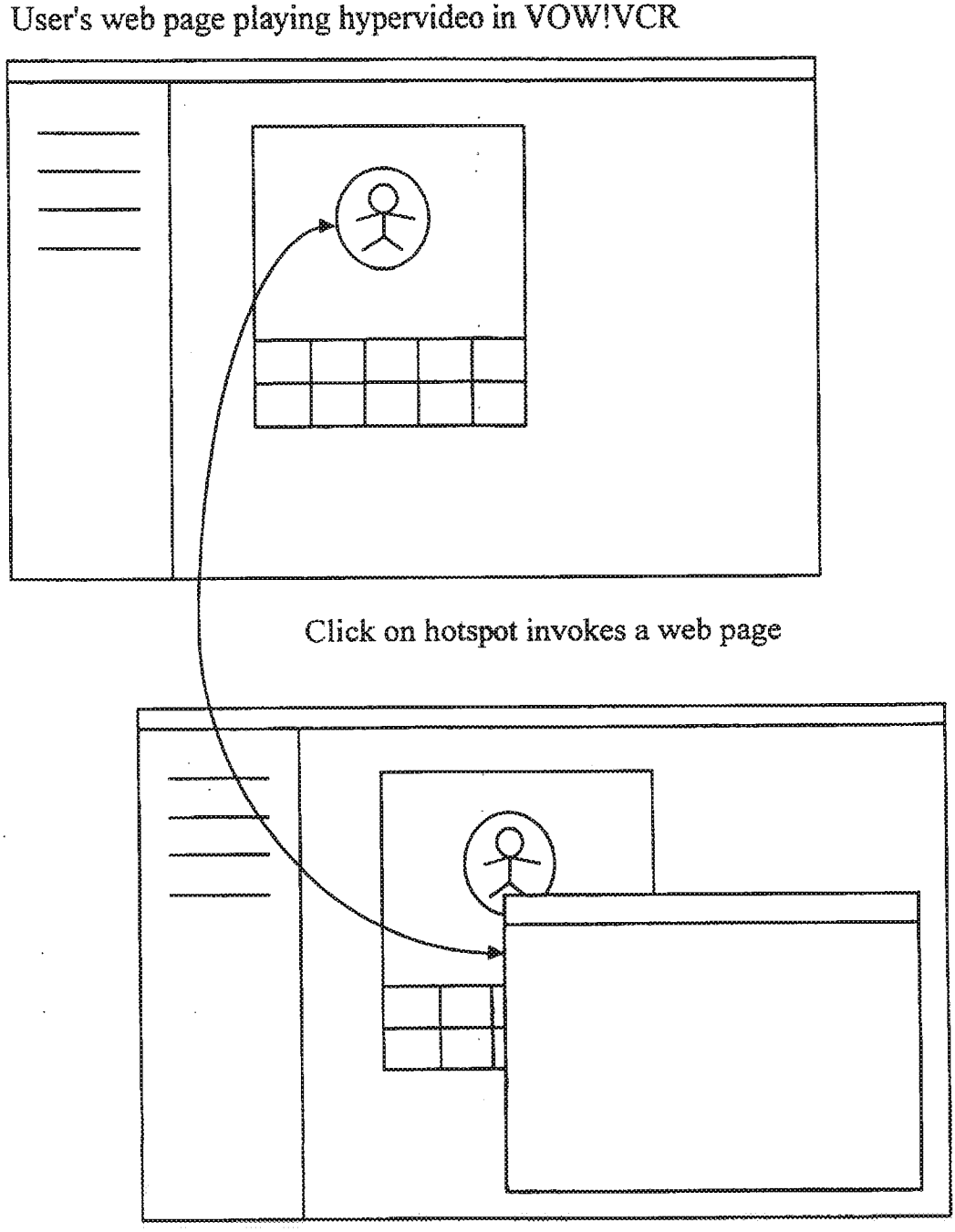

User's web page playing hypervideo in VOW!VCR
Click on hotspot invokes a web page

Fig. 6

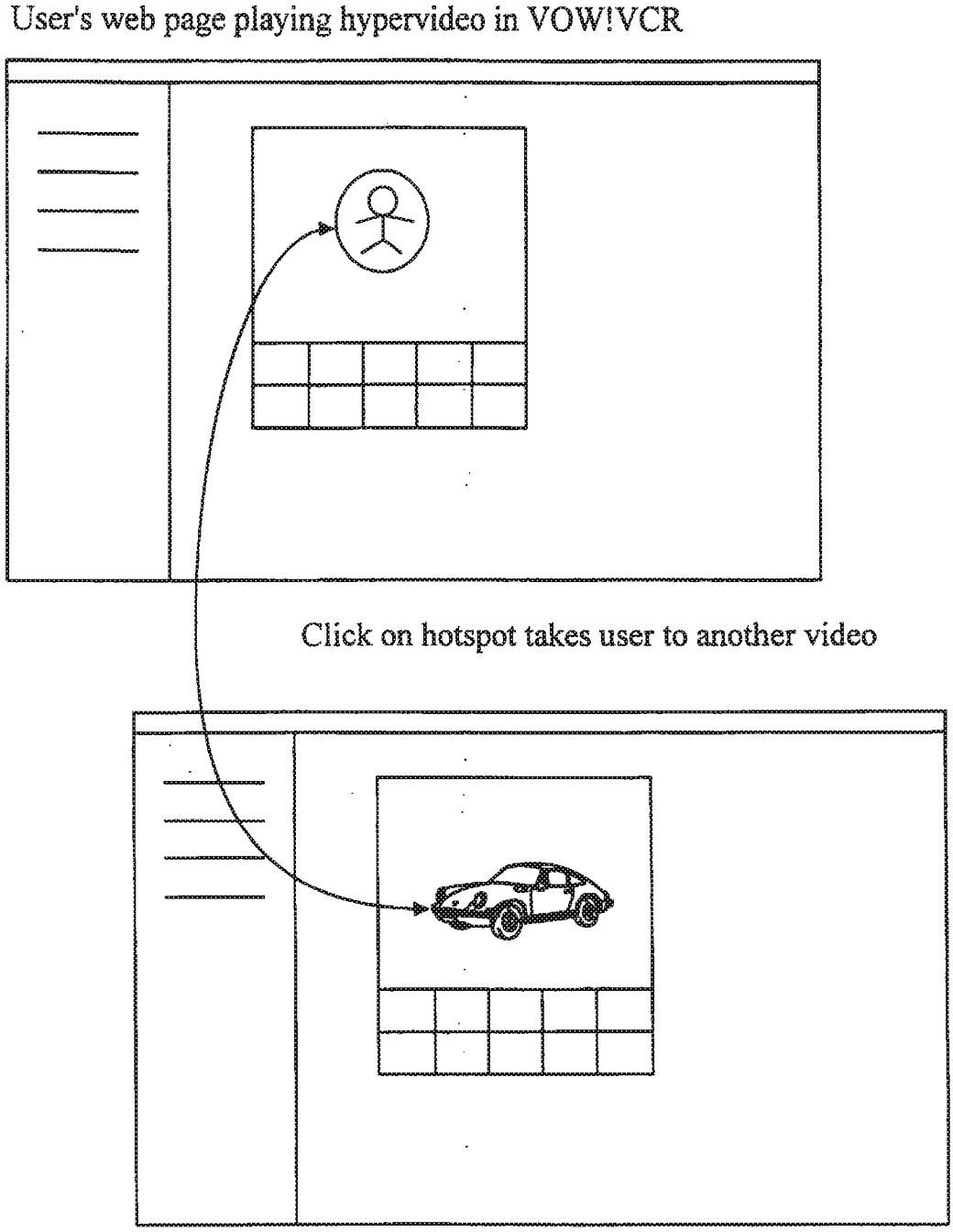

User's web page playing hypervideo in VOW!VCR
Click on hotspot takes user to another video

Fig. 7

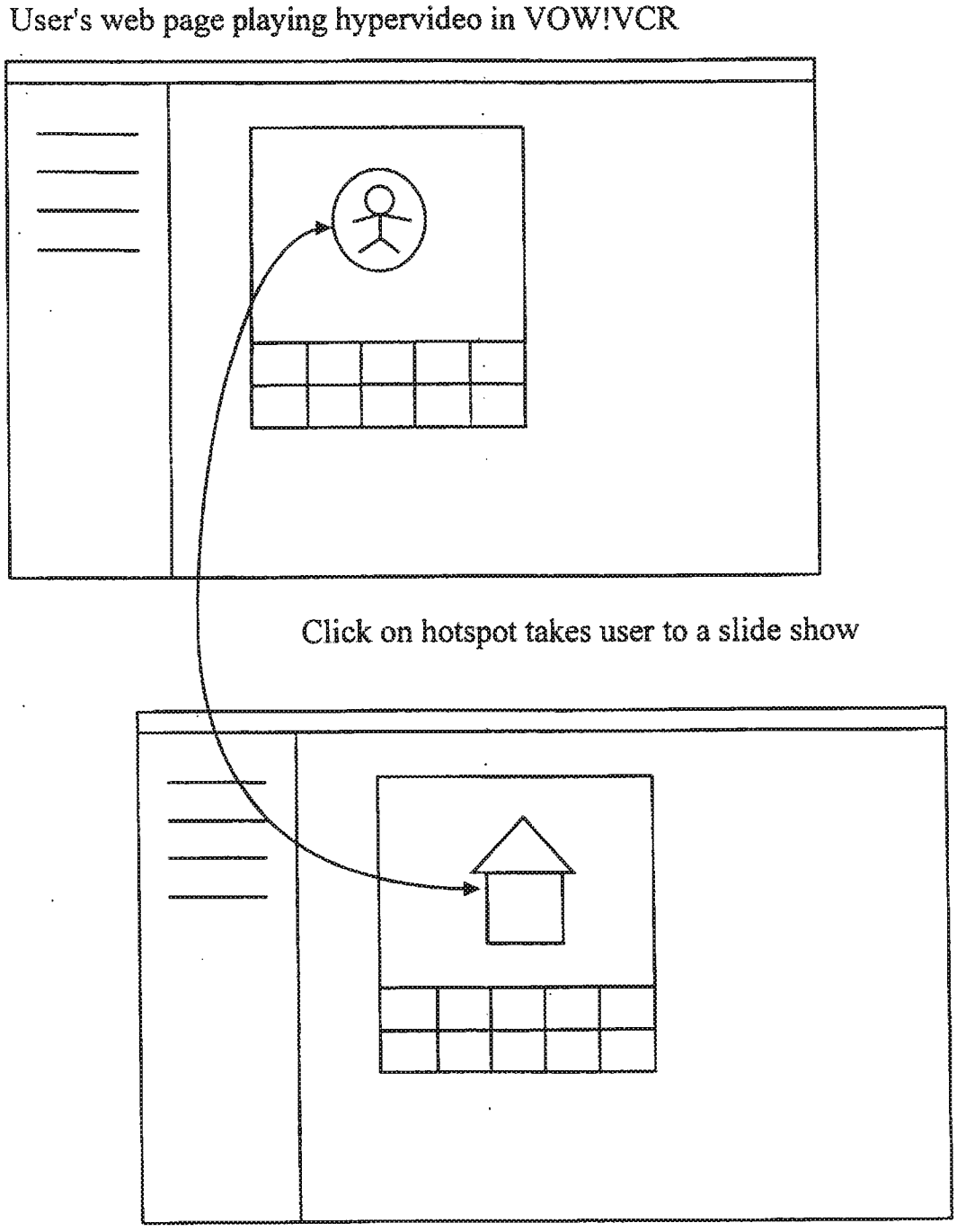

User's web page playing hypervideo in VOW!VCR
Click on hotspot takes user to a slide show

Fig. 8

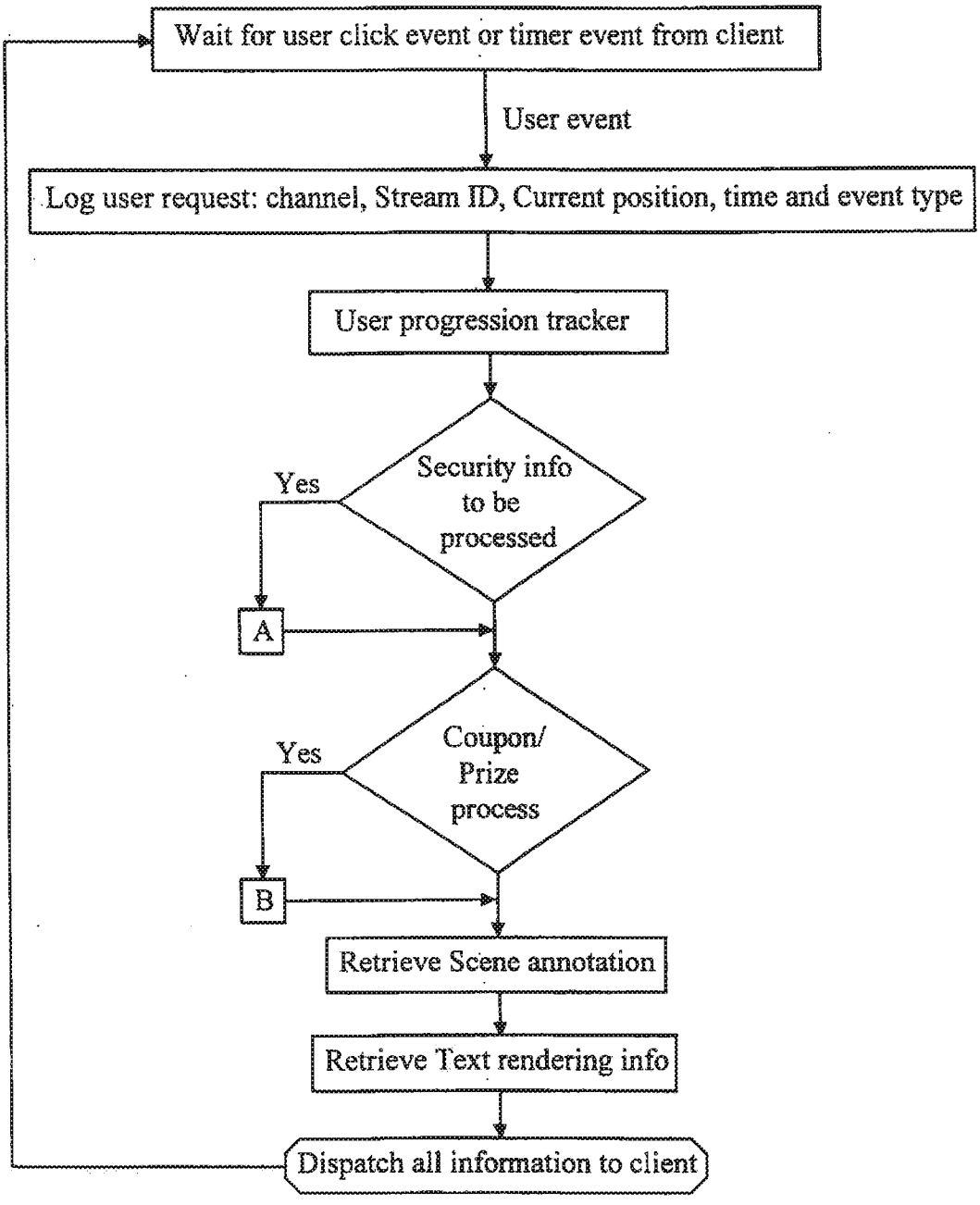

Wait for user click event or timer event from client
User event
Log user request: channel, Stream ID, Current position, time and event type
User progression tracker
Security info to be processed
Yes
A
Coupon/ Prize process
Yes
B
Retrieve Scene annotation
Retrieve Text rendering info
Dispatch all information to client

Fig. 9

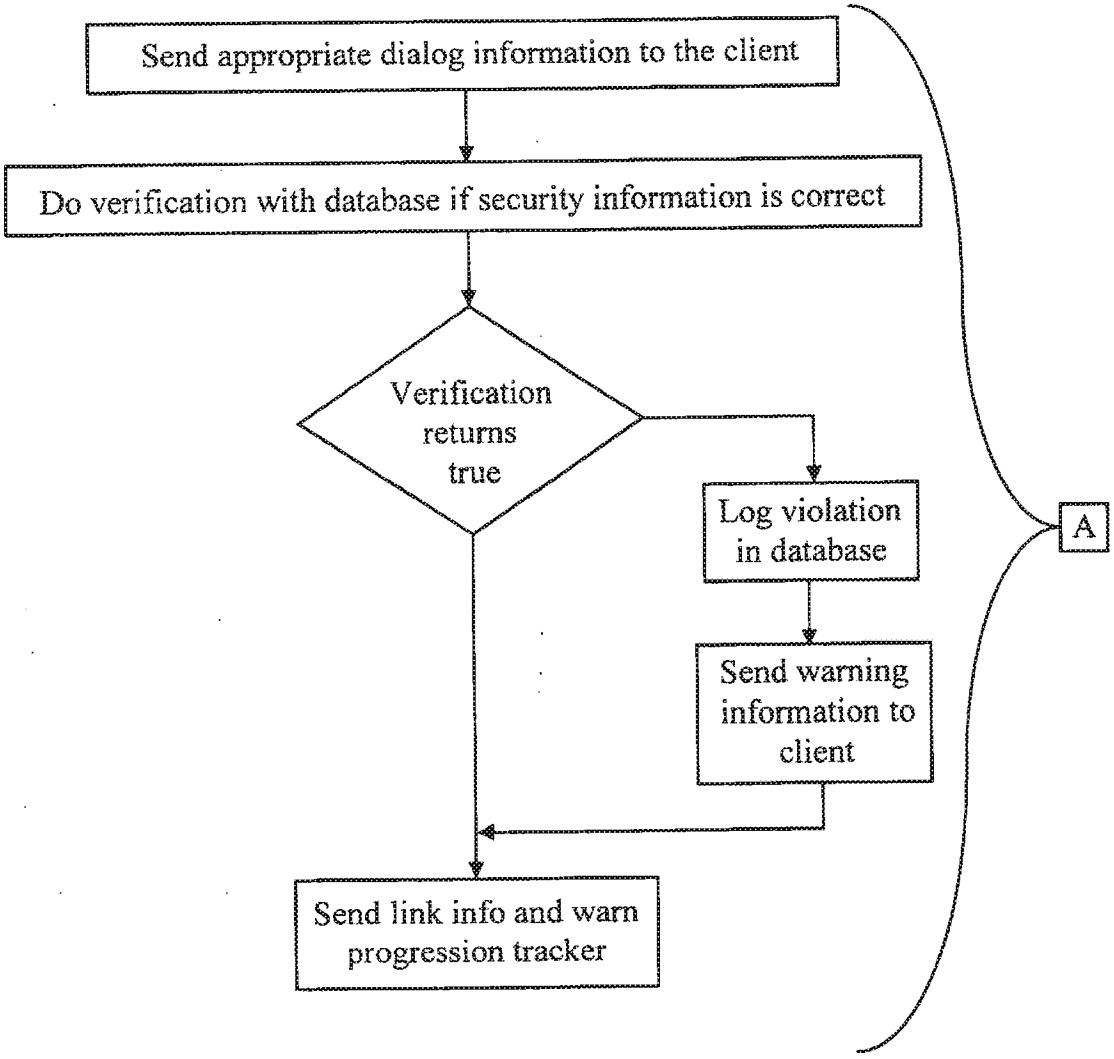

Send appropriate dialog information to the client
Do verification with database if security information is correct
Verification returns true
Log violation in database
Send warning information to client
Send link info and warn progression tracker
A

Fig. 10

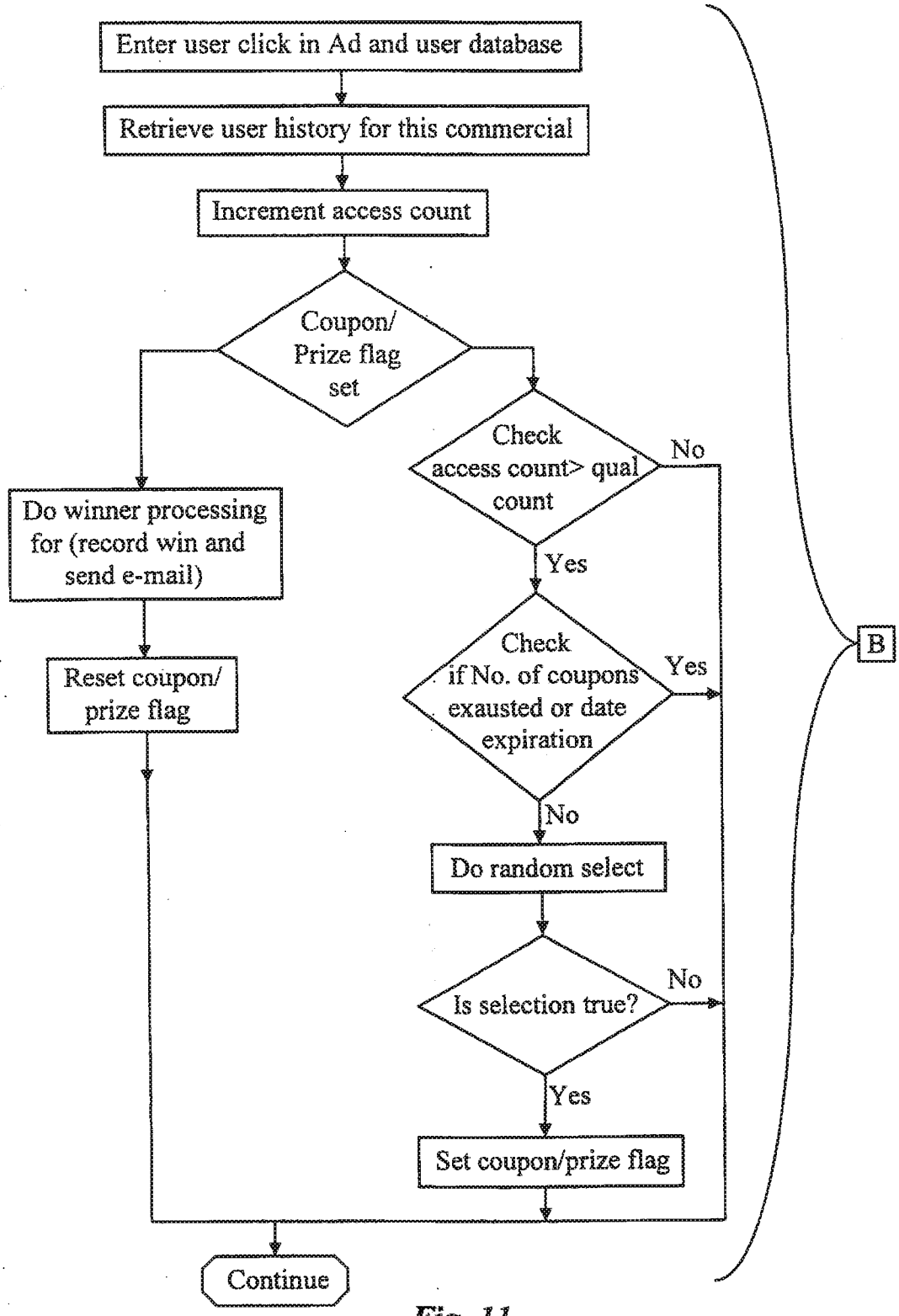

Enter user click in Ad and user database
Retrieve user history for this commercial
Increment access count
Coupon/ Prize flag set
Do winner processing for (record win and send e-mail)
Reset coupon/ prize flag
Check access count> qual count
No
Yes
Check if No. of coupons exausted or date expiration
Yes
No
Do random select
Is selection true?
No
Yes
Set coupon/prize flag
Continue
B

Fig. 11

HYPERLINKS RESOLUTION AT AND BY A SPECIAL NETWORK SERVER IN ORDER TO ENABLE DIVERSE SOPHISTICATED HYPERLINKING UPON A DIGITAL NETWORK

RELATION TO RELATED PATENT APPLICATIONS

The present patent application is related to the following U.S. patent application: Ser. No. 09/088,513 for the REAL-TIME RECEIPT, DECOMPRESSION AND PLAY OF COMPRESSED STREAMING VIDEO/HYPERVIDEO, WITH (1) DISPLAY OF PAST SCENES, (2) RETROSPECTIVE HYPERLINKING AND/OR RETROSPECTIVE RECORDING AS ARE BOTH KEYED TO DISPLAYED PAST SCENES, AND, WITH SPECIAL SERVER SUPPORT, (3) DIVERSE VERSATILE RESPONSES TO HYPERLINKS, filed on Jun. 1, 1998, which application concerns a client subscriber/user/viewer upon the same digital communications network as is the special server of this application, and the of the related applications is to inventors including certain inventors of the present application.

All applications are assigned to common assignee Tata America International Corporation. The contents of the related patent applications are incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present and related inventions generally concern (i) the machine-automated distribution, processing and network communication of streaming digital video/hypervideo, particularly upon digital networks having network content providers (nominally an "Internet Content Provider", or "ICP"), network service providers (nominally an "Internet Service Provider", or "ISP"), and network client subscribers/users/viewers ("client SUVs"). The present and related inventions also generally concern the provision of diverse sophisticated responses—including branching, storage, playback/replay, subscriber/user-specific responses, and contests—to SUV "click-throughs" on hyperlinks embedded within streaming digital hypervideo.

The present invention in particular concerns software processes operating at a special digital communications network server called a "Video On Web Server", or "VOW Server". This VOW Server does not normally serve streaming digital video, nor hypervideo (which instead comes from video servers that may be associated with any of content providers, network service providers, and/or third-party network sites such as advertisers) upon the network, but rather interprets hyperlinks present in streaming digital hypervideo when these hyperlinks are selectively exercised by individual client subscribers/users/viewers (SUVs) of the hypervideo. The hyperlink interpretation that is the field of the present invention is in particular directed to customizing the hyperlinked response(s) accorded each and every client SUV. As well as being customized to the individual client SUV, the responses are very diverse in nature, potentially invoking many different network resources at many different network locations.

2. Description of the Prior Art

2.1. Introduction to the Theory of Hypervideo

There is no requirement to read the present section 2.1—which section is based on the early investigations and research into hypervideo of Sawhney, et al., as transpired at MIT (reference cited below)—in order to understand the function, and, at a crude level, the purpose(s) of the present invention. However, hypervideo is, as of the present time (1998) very new, and few people have experienced it. The present section may accordingly beneficially be read in order to gain a "feel" for hypervideo.

More fundamentally, the present section discusses the considerable power of hypervideo, and ends with a discussion of the empowerment that hypervideo provides to a user-viewer. The present and related inventions, although they can be narrowly thought of as mere systems and methods for delivering lowly commercials in the hypervideo environment, are really totally consistent with the more profound, and the more ennobling, purposes of hypervideo. Therefore the present section may also beneficially be read to understand to what purposes—both good and ill—hypervideo may be put, and as background to how the present and related inventions serve these purposes.

In recent years Sawhney, et al., at MIT (reference cited below) have developed an experimental hypermedia prototype called "HyperCafe" as an illustration of a general hypervideo system. This program places the user in a virtual cafe, composed primarily of digital video clips of actors involved in fictional conversations in the cafe; HyperCafe allows the user to follow different conversations, and offers dynamic opportunities of interaction via temporal, spatio-temporal and textual links to present alternative narratives. Textual elements are also present in the form of explanatory text, contradictory subtitles, and intruding narratives. Based on their work with HyperCafe, Sawhney, et al. have been leaders in discussing the necessary components and a framework for hypervideo structures, along with the underlying aesthetic considerations. The following discussion is drawn entirely from their work.

"Hypervideo" can be defined as "digital video and hypertext, offering to its user and author the richness of multiple narratives, even multiple means of structuring narrative (or non-narrative), combining digital video with a polyvocal, linked text." Hypervideo brings the hypertext link to digital video. See Sawhney, Nitin, David Balcom, Ian Smith "HyperCafe: Narrative and Aesthetic Properties of Hypervideo." Proceedings of the Seventh ACM Conference on Hypertext. New York: Association of Computing Machinery, 1996.

An even earlier approach to hypermedia was proposed by George Landow, in which he offered rules for hypermedia authors, rules that took into account hypermedia's derivation from print media and technologies of writing. Landow proposed that hypermedia "authors" learn which aspects of writing applied to the emerging hypermedium, and which traits or characteristics needed redefinition and rethinking. He noted: "To communicate effectively, hypermedia authors must make use of a range of techniques, suited to their medium, that will enable the reader to process the information presented by this new technology." See Landow, George P. "The Rhetoric of Hypermedia: Some Rules for Authors." Journal of Computing in Higher Education, 1 (1989), pp. 39–64; reprinted in Hypermedia and Literary Studies, ed. by Paul Delany and George P. Landow, Cambridge, Massachusetts: MIT Press, 1991.

Hypervideo has its roots in both hypertext and film. As a result, hypervideo embodies properties of each field, but wholly can be placed in neither, for hypervideo is not strictly linear motion picture, nor is it strictly hypertext. This convergence known as hypervideo comments on each discipline, on their similarities, and on their differences. Hypervideo is potentially nonlinear, like hypertext, but

displays moving images, like film. Hypervideo can signify through montage, like film, and can generate multiple dictions, like hypertext. Properties of each medium are present in hypervideo. These properties take on new forms and practices in hypervideo.

Hypervideo relocates narrative film and video from a linear, fixed environment to one of multivocality; narrative sequences (video clips followed by other video clips) need not subscribe to linearity. Instead of creating a passive viewing subject, hypervideo asks its user to be an agent actively involved in creation of text through choice and interaction. Hypervideo can potentially change viewing subject from a passive consumer of the text to an active agent who participates in the text, and indeed, is engaged in constructing the text.

Just as hypertext necessitated a re-reading of the act of reading and writing, hypervideo asks for a re-viewing of narrative film and film making and practices of viewing a film. Hypervideo redefines the viewing subject by breaking the frame of the passive screen. Hypervideo users are participants in the creation of text, as hypertext readers are.

Research is presently (circa 1997) projected to determine just how users of hypervideo systems navigate, interact with, and experience hypervideo-texts. Just as J. Yellowlees Douglas has exhaustively researched hypertext readers and the act of hypertext reading, similar projects are expected to be undertaken by hypervideo researchers. See Douglas, J. Yellowlees. "Understanding the Act of Reading: the WOE Beginner's Guide to Dissection." Writing on the Edge, 2.2. University of California at Davis, Spring 1991, pp. 112–125. See also Douglas, J. Yellowlees. "'How Do I Stop This Thing?': Closure and Indeterminacy in Interactive Narratives." Hyper/Text/Theory, ed. by George P. Landow. Baltimore: The Johns Hopkins University Press, 1994.

Hypervideo is related to film. Hypervideo has the potential to reveal important associations present in a film, and the constructedness of linear filmic narratives, and to this end, would be a beneficial tool for use with film studies education and research. Hypervideo can make available, by way of link opportunities, the different associations and allusions present in a filmic work. These associations are made manifest with hypervideo, made available for the student (or teacher) to see and explore. Relationships between different films can then be tracked, linked, commented on, revealed.

Hypervideo engages the same idea of "processing" that hypertext writing does: in writing hypertext, one makes available the process of writing, representing it visually (in the form of the web the writer builds), rhetorically (in the linking structure of the work, the points of arrival and departure present in the text)-and so one makes apparent the tensions and lines of force present in the act of writing, and the creation or reification of narrative. "Writing" hypervideo does the same for image-making-that is, makes clear the notion of constructing images and narrative. In the case of hypervideo, "narrative" refers to narrative film making. Just as hypertext has within it the potential to reveal the constructedness of linear writing, and to challenge that structure, hypervideo does the same for narrative film making-while also offering the possibilities for creating rich hypervideo texts, or videotexts.

How does narrative film function in hypervideo? Narrative film is necessarily re-contextualized as part of a network of visual elements, rather than a stand-alone filmic device. Because narrative segments can be encountered out of sequence and (original) context, even strictly linear video clips are given nonlinear properties.

Sergei Eisenstein pioneered the concept and use of montage in film. Hypervideo reveals and foregrounds this use. Eisenstein proposed that a juxtaposition of disparate images through editing formed an idea in the viewer's head. It was Eisenstein's belief that an idea-image, or thesis, when juxtaposed through editing, with another, disparate image, or antithesis, produced a synthesis in the viewing subject's mind. In other words, synthesis existed not on film as idea-image, but was a literal product of images to form a separate image-idea that existing solely for the viewer.

Eisenstein deliberately opposed himself to continuity editing, seeking out and exploiting what Hollywood could call "discontinuities." He staged, shot, and cut his films for the maximum collision from shot to shot, sequence to sequence, since he believed that only through being force to synthesize such conflicts does the viewer participate in a dialectical process. Eisenstein sought to make the collisions and conflicts not only perceptual but also emotional and intellectual." See Bordwell, David and Kristin Thompson. Film Art: An Introduction. Fourth Edition. New York: McGraw-Hill, Inc., 1993.

Hypervideo potentially reveals this thesis/antithesis dialectic, by allowing the user to choose an image-idea (in this case, a video clip), and juxtaposing it with another image-idea (another video clip). Hypervideo allows the user to act on discontinuities and collisions, to engage with colliding subtexts and threads.

The user selects a video clip from a black canvas of three or four clips. Each clip lies motionless on the canvas. The user drags a clip onto another one, and they both start to play. Voices emerge and collide, and once-separate image-ideas now play concurrently, with one image extending the frame of the other. The user is left to determine the relationship between the two (or three or four) video clips.

Such video intersections recall Jim Rosenberg's notion of simultaneities, or the "literal layering on top of one another of language elements." See Rosenberg, Jim. "Navigating Nowhere/Hypertex Infrawhere." ECHT 94, ACM SIGLINK Newsletter. December 1994, pp. 6–19. Instead of language elements, video intersections represent the layering of visual elements, or more specifically, visual elements in motion. This is not to say that words, in the case of Rosenberg's Intergrams, are not visual elements; on the contrary, they are. In fact, their image-ness is conveyed with much more clarity (and even urgency) than are non-simultaneous words, or words without an apparent visual significance (save the "transparent" practice of seeing "through" letter-images into words into sentences into concepts). Once the word-images have to contend with their neighbor-layers for foreground screen space, their role in both the practice of signification (where meaning is contingent on what neighborly 0's and 1's are NOT), and as elements of a user interface (words that yield to the touch or click or wave of the mouse) become immediate and obvious. Nor is this to say that video clips aren't "language elements"; on the contrary, they are. The hypervideo clip is caught, as are words and letters, in the act of signification and relational meaning-making (. . . what neighborly 0's and 1's are not . . .), mutable to the very touch of user, to the layers above and below.

The hypervideo author can structure these video intersections in such a way that only X and Y clips can be seen together, or X and Z if Y has already been seen (like Storyspace's guard fields), and so on, and the author can decide if a third video should appear upon the juxtaposition of X and Y. For example, Video X is dragged onto Video Y and they both start to play. The author can make a choice to then show video Z as a product, or synthesis, of the juxtaposition of Videos X and Y, that reflects or reveals the relationship between Videos X and Y. This literal revealing

of Eisenstein's synthesis is made possible with hypervideo. Of course, no synthesis need be literally revealed; that can be left up to the viewer. While the interactions are structured by the hypervideo author or authors (as Eisenstein structured the placement and editing of thesis and antithesis idea-images), the meaning-making is left up to the hypervideo user. His or her choice reveals meaning to him with each video intersection; meaning in the system is neither fixed nor pre-determined. This empowering principle of hypertext is also a property of hypervideo.

2.2. Recent Practical Developments in Hypervideo

The V-Active HyperVideo Authoring Environment of Ephyx Technologies, Ltd. is a hypervideo authoring tool reportedly designed to develop interactivity in full-motion digital video applications. The V-Active product is based on a proprietary hypervideo technology that enables (i) automatic definition of objects, or hotspots, within an application's video stream and (ii) linking of those objects to video, sound, and text files, plus Web URLs.

Using an image processing algorithm, the V-Active' product is reported to define a video hotspot once and to then automatically maintain this hotspot across the video sequence. The software is reportedly capable of maintaining the hotspots even through fast action and low-light video sequences. Developers can choose among a dozen hotspot attributes, including author-defined shapes, overlay colors, and cursor-overrun reactions.

Ephyx calls this authoring strategy hypervideo—full-motion digital video with embedded hyperlinks to related content through automated means of creating video "hotspots." In accordance with the general concept of hypervideo, these hotspots link moving objects within a video sequence to a variety of media, including static pictures, text, sounds, URLs, other video sequences, or executable software applications. Hotspots are evident to the user either by changes in the cursor shape or on-screen object-specific highlighting. Other features of the V-Active product include automated motion tracking, synchronized playback of multiple media elements streaming simultaneously, and platform independence and support for numerous digital video formats.

The Ephyx software reportedly also enables developers to create applications in which end-users simply click on highlighted objects within a video to link instantly to related content via various connections, including selected URLs. The V-Active product further reportedly permits that hyperlinked videos created with V-Active may be integrated into a variety of environments; a V-Active Director Xtra integrates V-Active interactive video elements into Director applications, while the V-Active ActiveX Control and V-Active Netscape Plug-In embed hyperlinked video into Web pages.

With V-Active, authors can enable pointing and clicking between digital video hotspots, and they can also define any moving objects as gateways to other video sequences or to activating other applications. Interactive video clips produced with V-Active can be integrated into existing environments using a Macromedia Director 5 Xtra and Microsoft Active X control. Refer to the web page and product literature of Ephyx Technologies, P.O. Box 12503, 9 Maskit Street, Herzliya 46733, Israel (http://www.ephyx.com as of 1998).

SUMMARY OF THE INVENTION

The present and related inventions contemplate high-performance hypervideo. In general, the inventions contemplate (i) machine (computer) processes for efficiently making effective—meaning powerful and useful—hypervideo, and (ii) machine (computer) processes for providing versatile, unique and highly useful responses to the hypervideo so made.

The hypervideo (i) so made, and (ii) so used, goes way beyond mere digital television with embedded hyperlinks communicated upon a digital network—interesting, useful and, in parts, novel as even this concept may be. Instead, the present and related inventions contemplate full custom hypervideo: each and every one of hundreds and of thousands of subscriber/user/viewers upon a digital communications network is, by and large, (a) receiving copious digital hypervideo hyperlinks, with (b) any and all actions ("click-throughs") on any hyperlinks being resolved in respect of (i) when it happens, (ii) from which client SUV it happens, and (iii) even in respect of what is happening at other client SUVs.

Although, to some, it may initially appear impossible that, circa 1998, tailored customization and versatility of any great magnitude in the delivery of digital information so extensive as is hypervideo could be realized in and by existing computers communicating across existing broadband digital networks, the present and related inventions are quite feasible. Basically, in accordance with the present and related inventions, hypervideo management (for benefit of client SUVs, individually; as is the subject of the present invention) is partially divorced from hypervideo generation and delivery (as are the subjects of two related patent applications) is yet still further partially divorced from hypervideo use (in client SUVs; as is the subject of yet another related patent application). Thus the several demanding functions for a complete hypervideo system are distributed upon the digital communications network. By this partitioning of the various functions within a digital network hypervideo system, the computer software processes of the present and related inventions—already implemented and presently running on (i) modern digital network servers communicating streaming digital hypervideo across cable networks to (ii) cable modems present in Pentium®-class personal computers of client SUVs—permit unprecedented flexibility. (Pentium® is a registered trademark of Intel, Inc.)

Basically every single one of thousands of client SUVs served by a single (typically neighborhood) network service provider (ISP), typically by coaxial cable, is able to select for viewing—whenever, in whatsoever sequence and at whatsoever pace, interruption(s) and branching as are then desired—several scores of different choices of video each of which is normally held available over a span of some days, and then replaced. In return for permitting thousands of client SUVs each to "do their own" thing in (hyper)video viewing, the ISP definitively knows what particular (hyper) video each (and every) individual client SUV is receiving. Furthermore, importantly, and in accordance with the present invention, a special network server (which may be located at the ISP, or as another server on the network) comes to know which responses (if any) each (and every) client SUV ever makes to hyperlinks.

Using the power of this knowledge, certain network resources provided/linked to the individual client SUVs—notably commercials—are "targeted" on the particular client SUV. Thus the "price" to the client SUV for high performance, flexibility and personal control in his/her (hyper)video viewing is that information is surrendered about his/her individual habits and preferences—which situation is, of course, nonexistent for television broadcast either on the airwaves or upon digital communications networks.

1. Context of the Present Invention Within Related Inventions, and Within a Complete System for Enabling Hypervideo on Digital Communications Networks

A first and a second related invention to the present invention respectively concern (i) making and (ii) distributing hypervideo. Hypervideo is (i) made from (a) video and (b) hyperlinks by software-based editing processes. Such a hypervideo editor is taught in the related patent application for HYPERVIDEO AUTHORING AND EDITING BY DRAGGING AND DROPPING DIVERSE HYPERLINKS INTO AUTOMATICALLY-DETECTED SCENE HOTSPOTS, WITH SCENES' DURATIONS BEING FURTHER AUTOMATICALLY DETECTED.

Perhaps more interestingly, these processes may be automated or semi-automated, so as to efficiently seamlessly insert hyperlinks into video, including in real time while the video remains compressed. Hypervideo may thus be both (i) made and (ii) distributed in real time, for example in the form of a hyperlink-annotated live video newscast. The insertion of video and hypervideo clips and hyperlinks in streaming digital video/hypervideo is taught within the related patent application for REAL-TIME TARGETED INSERTION OF VIDEO CLIPS, HYPERVIDEO CLIPS AND/OR HYPERLINKS IN COMPRESSED STREAMING VIDEO, INCLUDING DYNAMICALLY AT MULTIPLE POINTS BETWEEN CONTENT PROVIDERS AND SUBSCRIBERS IN DIGITAL NETWORKS.

The inserted hyperlinks will ultimately, and indirectly in accordance with the present invention, serve to access still further, other, digital (hyper)video clips, particularly commercials. This hyperlink insertion is normally done at any of a network content provider, or Internet Content Provider (an "ICP"), an Internet Service Provider (an "ISP"), and/or a Local Network Affiliate (a "LNA"). The video with inserted hyperlinks, ergo hypervideo, is variously received (by means ranging from a transported disk to network communication) at a network video server, and is ultimately served on demand to each client subscriber/user/viewer ("SUV") upon a digital communications network by this video server.

A next, third, related invention concerns the receipt of the streaming digital hypervideo upon the network, and the display at each of potentially thousands of client subscribers/users/viewers (client SUVs) of the received hypervideo and its embedded "hotspots" (which are visual manifestations of hyperlinks). Selective volitional exercise of any inserted hyperlink(s)—the existence of which hyperlink(s) is (are) made visually manifest to the SUV as hotspots on the video imagery—by the client SUV is typically by action of the SUV to "point and click" with a computer mouse, a so-called "click through".

A click-through on an embedded hyperlink by the client SUV sets in motion the present invention, which is a software-based process present upon a special network server. (This special server may, however, have other roles such as being a, or the, network/Internet content provider (ICP), video server, or network service provider/internet service provider (ISP).)

The present invention is particularly directed to the custom management of streaming digital video/hypervideo for each single one of potentially thousands and tens of thousands of subscribers/users/viewers (SUVs) upon a digital network communicating, inter alia, hypervideo. Each and every client SUV may receive any of (i) video/hypervideo content, (ii) hyperlinks, (iii) services, such as record/storage and playback/replay, (iv) controlled access to information (such as is commonly used to restrict viewing by children), and/or (v) contest results, in accordance with his, her or their unique (network) identity.

In functioning to manage and to condition plural streams of digital hypervideo responsively to, at least partially, the unique dictates (choices) and/or the unique identity of an individual SUV, a computer program of the present invention operating at the special server (which server may, however, also be an ICP, an ISP or a LNA) cooperatively interacts with a compatible computer program operating in the network-connected computer of the SWV.

The special server is called a "Video On Web Server", or "VOW Server". (It is also, alternatively, called a "HOTV™ Server", where HOTV™ is a trademark of Tata America International Corporation, assignee of the present invention; although this term will not be used within this specification.) At first presentation, the names "Video On Web Server", or "VOW Server" may be slightly confusing: this server does not particularly, primarily, or uniquely serve (hyper)video on the digital network, or web, it enables hypervideo on the digital network, or web, in a manner to be explained. To say again, the VOW Server is not normally a server of streaming digital video, or hypervideo, which normally comes from video servers that may be associated with any of content providers, network service providers, and/or third-party network sites such as advertisers. The VOW Server is given its expansive name because, however, it will soon be seen to enable the distribution and the progression, and the custom distribution and progression, of (hyper)video to, and at, all the network client SUVs.

The computer program resident at the client SUV, and complimentary to the "VOW Server", is called a "Video On Web Video Cassette Recorder", or "Video on Web VCR", or just simply "VOW VCR". (Similarly to the "HOTV™ Server", this client program is also called a "HOTV™ Client" where HOTVM is a trademark of Tata America International Corporation, assignee of the present invention; although this term will not be used within this specification.) This VOW VCR of the SUV is described in the companion patent disclosure for REAL-TIME RECEIPT, DECOMPRESSION AND PLAY OF COMPRESSED STREAMING VIDEO/HYPERVIDEO, WITH (1) DISPLAY OF PAST SCENES, (2) RETROSPECTIVE HYPERLINKING AND/OR RETROSPECTIVE RECORDING AS ARE BOTH KEYED TO DISPLAYED PAST SCENES, AND, WITH SPECIAL SERVER SUPPORT, (3) DIVERSE VERSATILE RESPONSES TO HYPERLINKS. The "SPECIAL SERVER" referred to in the title of this related application is the subject of the present application. Note that the "special server" supports "diverse versatile responses to hyperlinks".

In simplistic terms, the related inventions may be considered to concern (i) how to make fully group or community-customized and time-customized hypervideo, normally at an ICP/ISP/LNA, and (ii) how each SUV, or client, may sense and may exercise hyperlinks within streaming digital hypervideo, while the present invention concerns (ii) how the SUVs' exercise(s) of hyperlinks are accorded, at the special server (which may be the ICP/ISP/LNA), a fully customized interpretation.

Accordingly, the related disclosures and this disclosure may beneficially be read together.

2. Particular Objectives of the Present Invention

The present invention contemplates dynamic hyperlink resolution, meaning that a hyperlink—no matter whether initially distributed to a small network community or an entire nation, no matter whether recent or aged, and no matter with what (hyper) video "hot spot" ostensibly

associated—is not an invariant, inflexible and unchanging link to, at all times and by whomsoever exercised, a link to the same network location, nor to the selfsame identical network resource, but that, instead, the same hypervideo hyperlink, as and when exercised by each separate subscriber/user/viewer ("SUV") is differently interpreted by a special server dependent upon (i) which SUV, exactly, is believed to have exercised the hyperlink, (ii) the economic and/or accounts and/or credit status of the exercising SUV, (iii) the previously-expressed preferences of the SUV, (iv) the time of day, week, month or year, (v) the proximate exercise of the same or of related hyperlinks by other SUVs, and (vi) still other factors. After the exercised hyperlink is so interpreted by the special server (which occurs in the background, and without visibility to the SUV), then the SUV exercising the hyperlink is caused (by this special server, and by software processes running at the client SUV) to branch to a network location, or to access a network resource (which may even be a resource located locally at the SUV himself/herself/itself!), in consideration of all the factors of the exercise.

The present invention thus contemplates the custom interpretation and execution of hyperlinks "after the fact" of their creation. This is part of the implementation of full custom hypervideo by the present and related inventions: each and every one of hundreds and of thousands of subscriber/user/viewers upon a digital communications network is, by and large, (i) receiving common, or at most semi-custom, digital hypervideo hyperlinks (in accordance with a related invention), while (ii) any and all actions ("click-throughs") on any hyperlinks are resolved in respect of when it happens, from which SUV it happens, and even in respect of what is happening at other SUVs (i.e., the present invention).

Hyperlinks thus interpreted only when, and if, actually exercised by a specific SUV are thus susceptible of being focused, and targeted, on the particular specific SUV exercising the hyperlink. That is exactly what the present invention does: it makes hyperlinking (within streaming digital hypervideo) specific to (i) the particular place (the SUV), and to (ii) the particular time of the hyperlink exercise, and specific to (iii) still other factors.

Hyperlinks thus interpreted are always timely. Even if an SUV was to exercise a hyperlink in a hypervideo recorded some years previously, hyperlinking that is currently relevant will, in most cases, still ensue. For example, suppose an ancient hyperlink that—when all the numbers of the hyperlink's URL were interpreted—had really once been only a indirect means of accessing a commercial of a local Ford automobile dealership was to be, during the playback of a recorded hypervideo, clicked after the lapse of some years. The dealership may have disappeared or have changed, and the advertisement originally accessible from exercise of the hyperlink may have long since disappeared, but it is entirely probable in accordance with the present invention that encoding of the more significant bits of the hyperlink will always indicate that this hyperlink is somehow related to the Ford Motor Company. Logically a link to a current Ford site, and current a Ford commercial, would be served up to the hyperlink-exercising SUV—even if some particular long past commercial was no longer extant.

Hyperlinks thus interpreted are rationally ordered and responded to in consideration of the interpretation of all other hyperlinks. Logically only some limited, desired, numbers of hyperlink-exercising SUVs can be, and will be, declared "winners" of a contest or a lottery. Logically, no greater number of hyperlink-exercising SUVs will be concurrently sent to particular network site, nor concurrently directed to obtain a particular network resource, than the site or the resource can support; other SUVs being delayed or otherwise routed.

Hyperlinks thus interpreted are flexible. If some particular hyperlink proves popular and often-exercised, then the commercial or other network resource accessed by the hyperlink can be maintained. Any commercial or other network resource that could have been accessed through and by a hyperlink that is never exercised need not be maintained, or may be relocated to be accessed through some hyperlink that is exercised.

3. Dynamic (Hypervideo) Hyperlink Resolution

The present and related inventions go beyond the mere generation, and the network distribution, of streaming digital hypervideo, and custom hypervideo. The present invention, in particular, permits that responses to any "click-through (s)" made on any hypervideo link(s) by each and every separate SUV may be fully customized. Moreover, these customized responses may be in consideration not only of static or semi-static data such as who the responding client SUV is, and what is known about him/her, and what time of day and day of the week it is, etc., etc., but responses may also be dynamically formulated in consideration of the "click-throughs" made on hypervideo links by all the SUVs collectively. In other words, the present invention helps to empower hypervideo by acting on hypervideo link requests in a broad, substantial and versatile manner.

The manner in which the present invention works as is follows. Although hypervideo may potentially be sent from the network hypervideo server to as few as just one (watching) client SUV, the hypervideo, with its embedded hyperlinks, normally goes out to many client SUVs in common as a "multicast". The hyperlinks may be inserted by the ICP, or by the video server, or by the ISP in consideration of the local community or group receiving the hyperlinks (within the hypervideo), the time of day, etc. For example, hyperlinks that are (i) suitable to the perceived demographics of the (digital network hypervideo) audience, and/or (ii) localized to link (ultimately, indirectly, as next explained) the commercials of a local merchant, may be "served up" to some portion of the network audience in common. However, the upstream hypervideo providers do not normally find it efficient to fully customize thousands of hyperlinks per hour going to each of thousands of individual client SUVs when only an infinitesimal fraction of the hyperlinks will ever be exercised—even though they could so customize each and every hyperlink.

Instead, a single hyperlink at one spot in the hypervideo may be, and commonly is, delivered in common to many, or to all, client SUVs. Instead of leading directly to the ultimate network site, or network resource, that will (ultimately) be accessed by the client SUV if he/she "clicks through" on this hyperlink, the hyperlink instead points to a particular portal of the special server. For example, to use the universal resource locator (URL) notation of the world wide web, the hyperlink might be to http://www.specialserver.com/car__ford__ad__40. The client SUV does not normally see this URL, nor exactly care what it is. The URL may in fact be nothing but numbers, and may effectively be indecipherable as to exactly what response might be expected to be forthcoming from any exercise of the URL.

As the sample URL suggests, a car advertisement from Ford (the fortieth one of such) is to be expected from the client exercise of the sample hyperlink. But what advertisement, exactly? This is where the special server combines the (i) identity of the responding client SUV with (ii) pre-existing data bases (that are in part maintained from

collected responses) so as to deliver to the responding client SUV not, most commonly, the final resource (the advertisement) but, instead, most likely, another URL pointing to the advertisement. For example, if the client SUV clicking on a Ford motor car hotspot is from a poor neighborhood, and/or has shown a proclivity for austerity in consumption and/or automotive consumption, then an advertisement for a less expensive Ford automobile, and/or possibly one extolling economies of vehicular operation, might be linked for and to this particular client SUV. Conversely, if the client SUV clicking on a Ford motor car hotspot is from a rich neighborhood, and/or has shown proclivities for conspicuous consumption and/or automotive consumption, then an advertisement for a luxury Ford automobile, and/or possibly one extolling the prestige of Ford ownership, might be linked for this particular client SUV. Clearly still more subtle distinctions are possible. This is called "targeted advertising", the benefits of which are well understood.

Accordingly, the special server acts to "hand off" the client SUV to a target destination/resource. This is commonly done by sending back to the client SUV a very, very short and fast message containing a URL. The client SUV will then go out on the network to retrieve the resource at this URL, wheresoever it may be and howsoever long it may last. There is, of course, the possibility that the responding client SUV (i) cannot reach the special server, or (ii) is exercising an obsolete link portal, such as might occur if the client SUV is exercising a hyperlink on hypervideo recorded some weeks, months or years previously. There are many ways to deal with this situation, starting with the use of quite general portals (e.g., the http://www.specialserver.com/car__ford) at the server and continuing with default hyperlinks (e.g., http://www.specialserver.com/default or http://www.isp.com/nolink).

The software processes of the present invention may be present at any "special" service provider receiving, and acting upon, hyperlink "click throughs" anywhere within a (hypervideo) digital communications system. An advertiser pays the special server (and, or course, the ICP/ISP/LNA so that the hyperlinks are present in the first place) not just to receive "click through" traffic, but, particularly in the case of the special server, so as to know more about the persons clicking through. This may be for purposes of, for example, follow-up mailings or e-mailings. Normally the most "intelligence" resides within the SUV databases at the special server, while the network resource providers (the ICP, ISP, and/or LNA) and the advertisers are quite "dumb". An advertiser having a network site (a "web site") may, however, choose to "play" a different advertisement at the same network site depending upon the day, and/or the time of day, at which the site is accessed through a hyperlink.

Accordingly, the special server of the present invention acts on any "click-through(s)" made on any hypervideo link(s) by any SUV in a network hypervideo system so as to first interpret what in particular the SUV wants, and to then, so far as is possible and authorized, to either give it to him/her or, more commonly, to give directions to him/her as to how to get it.

The SUV may want, and may command by making a particular type of click on hyperlink (e.g., with the left mouse button), to branch into a new (hyper)video stream. As long as the new stream is not forbidden to the particular SUV because of content previously restricted (at least at the present time of day) by the SUV himself/herself (such as to control viewing by children), and/or because the selected video stream is pay-per-view and the SUV's account is not in good standing, the SUV will be fed a link to the new video stream (possibly uniquely out of all SUVs!).

Meanwhile, and quite remarkably, the old stream (the "mainstream") is also continued, and is still received and stored (for so long as capacity allows) in the background at the subscriber/user. (See the companion patent disclosure.)

The SUV may alternatively want, and may command by making a particular type of click on hyperlink (e.g., with the right mouse button) or by clicking a particular on-screen control button, to commence recording—which may, remarkably, be done from a retrospective point in time—or to, at a later time, stop recording. The recording will be stored locally for so long as capacity allows, which is typically not long (streaming digital video making voluminous use of memory), and will then be stored remotely upon the network, normally at the supplying ISP. Consider that the recording of the video stream that is being fed to any user is really transpiring all the time, as it is for all the video streams, at the ISP/LNA. (Indeed, if not a "live" video stream, the video stream is normally stored at the ISP/LNA.)

The SUV "click-through" really serves but to send out to the ISP/LNA a first time marker when recording is commenced, and a later time marker when recording is stopped. The SUV does not see, nor sense, this. When he/she goes to replay the recorded video then the stored video is retrieved, either locally or from the common central store, and is replayed to the SUV exactly as if is was a full-custom, or fully locally-stored, recording!

4. The Objectives, and the Capabilities. of the Special Server of the Present Invention in a Network Hypervideo System

The network server of the present invention is a software-controlled computer "server" operating in conjunction with 1) a video (or hypervideo) content server (a Network Content Provider, or Internet Content Provider, or simply an "ICP", and 2) a client (a "Video-on-Web VCR", or simply a "VOW VCR") which is described in lot the companion patent application. The software-controlled computer "server" of the present invention is itself commonly called a "Video on Web Server", or simply a "VOW Server".

The objectives of the VOW Server system of the present invention are as follows.

4.1 Multiple Sources of Multiple Hyperlinks all upon the Same Hypervideo Feeds

First, the VOW Server system of the present invention permits multiple hyperlinks from multiple sources to effectively coexist simultaneously within the same hypervideo feed. In crude terms, it permits multiple separate parties to get a "bite" at the SUV. This is because a SUV receives streaming hypervideo within which are imbedded hyperlinks arising from multiple feeds from separate sources. The originator of the hypervideo stream, or network Content Provider, or Internet Content Provider, or "ICP", adds the first hyperlinks. More hyperlinks may be added (by use of the VOW Server system of the related invention) within the same hypervideo stream by a regional distributor, and still more by a local network service provider (e.g., by an ISP or a LNA). If is crassly considered that all hyperlinks are simple commercials—which they need not be—then it is immediately apparent that, as one way of describing the situation, hyperlinks to each of national and regional and local advertisements will constantly be present in the hypervideo received by each SUV.

4.2 Customized Hypervideo. Both Overt and Covert Via Exercised Hyperlinks

Second, the VOW Server system of the present invention acts as a tool for the insertion of customized hypervideo commercials both overtly and covertly in the hypervideo

feed to each particular SUV. It will be understood that each SUV is receiving (network digital) video (hypervideo) on demand, and need not, and commonly is not, in synchronous sequence with any other SUV.

Moreover, in accordance with what providers at all levels want to send to a particular SUV—be the differential delivery be based on anything from crude demographics to an exacting personal profile of the individual SUV—the particular SUV will receive a variously customized regimen of both overt and covert commercials. Overt commercials are those that appear unless the SUV makes some effort, such as "fast-forward" or branch on link, to avoid them. They are analogous to commercials on commercial broadcast television.

The covert commercials are those that are present behind the hotspots and associated custom hyperlinks (which need not be exercised) that are presented to each SUV. Note that for either and all types of commercials the SUV may, and commonly does, branch on the network (at least temporarily) from a video (or hypervideo) stream originating at the ISP/LNA to another stream also originating at the ISP or the LNA acting as the commercial provider. In other words, when a particular SUV is presented a commercial from the Ford Motor Company, then he/she may have gotten the commercial from any of (i) the ICP, (ii) the ISP or the LNA, or (iii) even upon the communications network (nominally, the Internet) from some site (some Universal resource locator, or URL) at the Ford Motor Company, and not from any network content or service provider! Quite simply, commercials can, in accordance with the principles of network communication, come from almost anywhere.

The principle challenge is not how to deliver commercials, nor, for that matter, hypervideo itself. The main challenge is how to deliver commercials intelligently, and to good effect, without alienating the SUV from the commercials, or, in extreme cases, the medium (the digital communications network) of their transmittal.

4.3 Dynamic Hyperlink Resolution as Supports, Inter Alia. Network Lotteries and Coupons Distributions

Third, the seeded hyperlinks are resolved at run time. Any and all of the servers along the distribution of the video stream to the SUVs may intentionally insert links that have results that are, to the SUVs and to any individual SUV, any of unexpected, randomized, and/or chance. These links are resolved at run time when a SUV clicks on objects in video (including advertisements), and thereby determines the link destination to which the SUV's VOW VCR agent will go. This process is referred to as "dynamic hyperlink resolution". This concept may be used, among other important purposes, to implement a "lottery" or "coupon" system in commercials in a manner hitherto unseen in either streaming video or television media.

Note that this "dynamic hyperlink resolution" can be implemented in many different ways. A unique hyperlink may be distributed to one, or to a few, SUV. The entire SUV audience may be told to "click on the new Ford" and "if you see a red star then please click through because you have won a new car". The SUV audience is then further told "but if you don't then please click through to see our Fall bargains anyway". (To prevent automated, or hacked, interception of winning "codes" by SUV-installed software filters, the "red star" may be a one-time symbol, or symbol unique to an individual SUV, and not publicly known.) The class of potential winners has thus been identified before the fact (of the distribution of winning "tickets", much like lottery scratch-off tickets).

Alternatively, the class of potential winners may be identified after the fact (much like regular lottery tickets, where the winning numbers are pulled after the tickets are sold). Many SUVs may get (from time to time, and in time rotation) the same hyperlink, where a "caller number 100" will win the car. In this case the network site—the special server—to which all SUVs clicking-through become routed keeps track of SUV responses, and identifies the winner.

4.4 Insertions of (i) Scene Change Points and (ii) Associated Text Annotations. Particularly as Exemplifies that Virtually Any Type of Information Can be Appended to Streaming Hypervideo

Fourth, the VOW Server system of the present invention permits that virtually any type of information can be appended, or hyperlinked, to streaming hypervideo at the last, and concurrent with, or even after, hypervideo (with contained hyperlink) distribution.

In accordance with a related invention, (i) pre-determined scene change points, and (ii) the associated text annotations for those scenes, as supplied within the streaming hypervideo. (Text annotations are not hyperlinks, although they may be associated with hotspots and hyperlinks such as, for example, to give an textual explanation of the hotspot and associated hyperlink.) These (i) scene change points and (ii) associated text annotations are of importance in organizing the display of the present and the historical hypervideo, and hyperlinks, by the client SUV, or, more precisely, the "Video-on-Web VCR," software process running at the Client SUV. These (i) scene change points and (ii) associated text annotations are sometimes predetermined by humans—who clearly do not perform this task in real time. This would commonly be the case if the content provider was delivering, for example, a movie. The "scene change points" would be related to major transitions in the movie, and all annotations could be carefully drafted.

However, the (i) scene change points and (ii) associated text annotations may alternatively be determined, and, in accordance with the related invention, inserted into streaming hypervideo, in real time! This would be typical, for example, of a live news transmission. The simplest "scene change points" are readily detectable by machine process from changes in the scene images. The (ii) associated text annotations may be provided by anyone from a stenographer to a voice recognition program to a "canned" schedule of the news program, much in the manner of present-day captioned television. The (ii) associated text annotations can be omitted without deleterious effect other than the attendant loss of the associated information.

Although the (i) scene change points, and (ii) associated text annotations, have a very logical, and elegant, purpose as is discussed in a companion patent application, their importance in the present invention is as an indication of the tremendous flexibility of the VOW Server system of the invention in inserting just about any nature or any type of information whatsoever into streaming hypervideo. Clearly it is equally possible to insert in real time any of (i) captions, (ii) music, (iii) commentary, or (iv) control codes into responses made to SUV click-throughs on hyperlinks within streaming hypervideo by use of the VOW Server of the present invention.

But, consider this: some selected types of hyperlinks and hyperlinking may be made mandatory, and need not be subject to "point and click" by the Client SUV in order that hyperlinking should ensue. This means that the same (i) captions, (ii) music, (iii) commentary, or (iv) control codes may be, by use of the present invention, effectively inserted into, or linked so as to effectively become within, streaming digital hypervideo after the fact of the multicast of this hypervideo.

This is exactly how (hyper)steaming video is enabled to incorporate functions taken for granted on (modern) television. For example, an uneliminatable unavoidable always-exercised hyperlink to a possible, sometimes present, severe weather warning (i) message, and/or (ii) a warning tone, may be inserted. The steaming hypervideo receiver is then (to the extent that it runs through these mandatory hyperlinks) always a "weather radio"; it simply gets a null message, completely opaque to the SUV, most of the time. If a real emergency arises no (hyper)video nor any hyperlink needs be suddenly inserted into the hundreds of different (hyper)video streams being watched by the thousands of SUVs; hyperlinks already leading to previously dormant messages may already be present. When the emergency arises, the hyperlinked message on some message server becomes no longer dormant, and "plays" at the SUV.

Video (hypervideo) presentations—such as, for example, of a state funeral—may be "back dropped" with (iii) commentary both audio and/or textual, which commentary may be viewed and/or heard or else suppressed by SUV preference.

Still further for example, a (iv) logic bomb—which for all digital technologies is in fact no more than simple programmed directives—may be sent to a non-paying SUV.

Each of these separate scenarios, for separate purposes, is worthy of considerable though and analysis. Suffice it to say only that there is some "control", and potential control, going on over the network and inside the streaming digital hypervideo. This quite unlike the world wide web, where each client with his or her browser goes when and where lie or she will, willy nilly. Instead, there is some degree of directivity, and potential latent directivity, "built in" to the delivered hypervideo.

4.5 Security in Networked Distribution of Streaming Hypervideo

Fifth, the VOW Server system of the present invention supplies security information to the client, or the "Video-on-Web VCR". Such information may include whether or not a particular SDV has the authority to record a particular clip or not, or whether or not the SUV can jump to a particular clip via a hyperlink or not. This is similar to, but distinct from, the prior art pay-per-view situation where the remainder of a show can't be seen unless paid for.

As with the dynamic hyperlink resolution, the security information may be qualified either, or both, before and after the fact. Consider the following example. The "Jones" household with children has registered with its network service provider to decline notification of any "R"-rated pay-per-view offerings. When an advertisement for such an offering, or a hyperlink to a preview of such an offering, is issued out to SUVs in the SUV base, the "Jones" household will not receive either. The "Jones" household will, however, receive an advertisement and/or accompanying hyperlink to a "G"-rated pay-per-view offering. Alas, the hyperlink leads, again by prior-stated preference of the Jones household, not to the preview, but rather to a security filter requiring entrance of a password. Little "John Jones", not having the password, might as well keep on with his (streaming hypervideo) lessons. Big "Jack Jones", John's father, has the password and enters viewing of the preview. When after viewing the preview, however, "Jack Jones" decides to immediately partake of the pay-per-view offering, and clicks through in an attempt to do so, then the pay-per-view server knows from comparing Jack's entrance code—previously provided uniquely to Jack's server one time at the earlier start of the preview—to the credit list for all codes that Jack has not paid the Jones's last bill, and must receive a dunning message instead of the desired pay-per-view offering.

The considerable importance of the present invention in the context of security is a follows. A capability for strong positive transactional control is clearly inherent in any network transaction where each party is certain as to who, and only who, is at the other end of a communications link. At the present time, this control is established by forming a point-to-point secure link, typically encrypted, the security of which link is valid only so long as the link is maintained. (These links are typically presently used in Internet commerce.) The problem arises when, in the world of the nearly infinite branching possibilities of hyperlinks, a security feature must be offered or enforced at a time later than, and possibly very greatly later than, an occurrence upon which the security function will be predicated.

The basic solution to this problem is what cryptologists refer to as the "one time pad". Party A gives party B a unique number which is good to transmit (or to predicate) information in the future but one time only. Once the unique number is used once for information transmission from B to A, then it is forever discarded.

In the context of streaming hypervideo, the implementation of a one time pad is straightforward. For each and every network security event prospectively in the future to be presented—and even those events that will never be, in fact, broached by every SUV—timely issue to each individual SUV a unique number (which may, but need not be, be in form of a unique URL) for each event. If the "right" SUV in the future comes to have the "right" number, then a security filter is satisfied, and not otherwise.

The challenge is clearly to give every single SUV a stream, which may be a copious stream, of unique numbers. Generation and management of the numbers is no big problem; distributing them to the SUVs is. This the present invention makes possible.

4.6 Monitoring, Accumulation, and Use of User-Subscriber Information as Represented by User-Subscriber Click-Throughs

Sixth, the VOW Server system of the present invention permits the gathering, and the accumulation, of valuable information regarding each SUV entity, regarding SUVs by groups that are regional or otherwise, and by all SUVs taken together. This is accomplished by recording SUV click-throughs and using this recorded information to develop both personal, group and collective SUV statistics.

These and other aspects and attributes of the present invention will become increasingly clear upon reference to the following drawings and accompanying specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic view of the origin and transfer of digital video/hypervideo data upon a digital network to multiple subscribers/users/viewers (SUVs), including through, by way of example, an Internet Service Provider (ISP) or a Local Network Affiliate (LNA) acting as the essential special server, or VOW Server, where hyperlinks within hypervideo are resolved in accordance with the present invention.

FIG. 2 is a schematic block diagram of the major software components of the VOW Server (as communicates across the network with the Client SUVs) in the preferred embodiment of the present invention.

FIG. 3*a* is a block diagram of the production of hypervideo, containing both (i) hotspots and (ii) associated hyperlinks, at an authoring station in the content provider (shown in FIG. 1) the preferred embodiment system of the present invention.

FIGS. 3*b* through 3*d* are block diagrams of the control and data exchange between the VOW Server/Internet Service

Provider and the Client SUV in the preferred embodiment of the present invention.

FIG. **4** is a pictorial representation of a screen shot such as might be seen on a monitor of a Client SUV in the system of the present invention, which system was previously seen in FIGS. **1** and **2**.

FIG. **5** is a schematic view of the architecture of a portion of the preferred embodiment of a system in accordance with the present invention (as was previously diagrammatically shown in FIG. **1**), the portion including 1) a video server, 2) a network "video on web" control server (the "VOW Server") which is commonly, and by way of example, located at a network service provider (the "ISP"), and 3) multiple "video on web VCRs" ("VOW VCRs") of Client subscribers/users/viewers ("SUVs").

FIG. **6** is a diagrammatic view illustrating that a Client SUV whose VOW VCR is playing hypervideo may click on a hotspot to branch to a network page display, or "web page".

FIG. **7** is a diagrammatic view illustrating that a Client SUV whose VOW VCR is playing hypervideo may click on a hotspot to alternatively branch to another video, or hypervideo.

FIG. **8** is a diagrammatic view illustrating that a Client SUV whose VOW VCR is playing hypervideo may click on a hotspot to alternatively branch to, by way of example among many different network resources two of which have already been diagrammatically illustrated in FIGS. **6** and **7**, a slide show.

FIG. **9** is a top-level software flow chart of the VOW Server of the present invention, by which software a Client SUV hyperlink "click-through" request is dynamically resolved.

FIGS. **10** and **11** are second-level software flow charts of the sequence of processing the Client SUV hyperlink "click-through" request in the VOW Server of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

1. Context and Environment of the Present Invention

It being assumed that the SUMMARY OF THE INVENTION section of this specification has been read, this first paragraph of this section focuses on the larger systems environment in which the special server, and the dynamic hyperlinking processes, of the present invention, are operative. The present and related inventions contemplate computer systems and software tools that can automatically: 1) analyze an incoming stream of video for scene changes in real-time; 2) cut/copy/paste from/to the video, including so as to insert hotspots over inserted hyperlinks, thus making hypervideo; 3) delivering the hypervideo upon a digital communications from a hypervideo server to clients, whereupon the clients may "click on" hotspots in the moving hypervideo to hyperlink; 4) resolving the clients' hyperlinking at a special network server so that 5) the clients may ultimately branch as desired between network resources including hypervideo, 6) recording as desired any sequence thereof so as to build as desired a mosaic or album of interesting scenes. The present invention—which more particularly concerns functions 4) and 5)—is thus but one aspect of a more extended system, and concept.

The overall system could be called, and considered to be, "full performance hypervideo". Such "full performance" not only means that a Client subscriber/user/viewer (SUV) upon the digital hypervideo distribution network retrieves, by and large, the video/hypervideo he or she wants when he or she wants it—much in the manner of "surfing" the sites of the world wide web—but also that some sites or sites upon the network—normally but not exclusively, nor invariably, the Internet Service Provider (ISP)—come to know a great deal more about what, and when, the Client SUV is viewing than heretofore. This knowledge is not gained by any sort of insidious monitoring of the Client SUVs. Instead, it should be recognized that the Client SUVs from time to time identify, and link, to the (hyper)video that each wishes to view. It is simply necessary to set up a network structure where these Client SUV choices can be assimilated, catalogued, and, optionally optimally, acted upon. This the present invention accomplishes; permitting (i) the ready gathering of Client SUV "interest" data as is expressed by "click-throughs" on hypervideo hotspots having associated hyperlinks, and (ii) the use of the cumulative data so gathered to at least partially, and/or from time to time, predicate the issuance of, and/or the branching (linking) in respect of, further hyperlinks later in time. There is thus a trade: the Client SUV, as an inevitable consequence of "surrendering" interest information, permits that this information should be reasonably, and intelligently, interpreted and acted upon so as to shape, if not the future viewing experience for the Client SUV (i.e., for purposes of propaganda, or pandering to Client bias) the future commercial offerings to the client (i.e., salesmanship). The result is generally favorable to both Client SUV and network advertiser: the Client SUV is ultimately absolved of watching "commercial" in which he/she has no interest, or is even hostile, and is instead presented, at least in part, with the focused and targeted information, albeit often commercial information, that busy lives require.

One related invention particularly concerns how, typically, both (i) video and hypervideo clips, typically containing advertising, and (ii) hotspots and associated hyperlinks, which hyperlinks commonly lead to advertising, may be inserted, if necessary on-the-fly, into streaming, compressed (normally MPEG compressed) video. Note that, in the vernacular, both (i) commercials and (ii) hyperlinks to commercial may be inserted, and commonly (at least for sponsored programming), both are. The insertion, and the management, of hyperlinks is separate from, and is different than, and should not be confused with, the fact that video and hypervideo clips may also be inserted as (typically periodically scheduled) commercials within the streaming hypervideo. In accordance with the related invention, both insertions may be done on-the-fly and while the hypervideo is streaming, and compressed (normally MPEG compressed).

Hyperlinks (such as are commonly associated with commercials) are, of course, distinguished from embedded (video and hypervideo) commercials for, inter alia, the fact that an embedded commercial will normally inevitably unfold unless action is taken by the Client SUV—possibly by clicking on a hyperlink!—while hyperlinked commercials will not normally unfold (i.e., be seen) unless specific Client SUV action is taken to click on a hyperlink.

Of course, in the networked real-time world things need not, and are not, always what they seem to be. The classic case of this is the "local" commercial, corresponding to the existing "station breaks" on network television where are inserted commercial messages from the local affiliates. Things get complicated when it is remembered that the video feed to the Client SUVs—insofar as there is one, or ten, or a hundred such—may have come to the ISP by satellite overnight, and the ISP is really both "station" and

"network". I should be understood that, in accordance with the present and related inventions, commercials can be "inserted" into network-distributed digital hypervideo, and video, in many places, and at many times—for even the same video content! It is not so much a challenge of how to get the commercials into the network distributions, but how to get them in so that digital networks do not become the "vast wasteland" ascribed to television.

It must in particular be considered that even the "regular" scheduled, commercials, can be accessed by hyperlinks, and hyperlinking! These "regular" commercials would thus be considered to be accessed by hyperlinks which, when arrived at within a streaming hypervideo, have a "default" mode which will cause hyperlinking unless the client does something to the contrary. The client customization ability of the present invention is thus useful in both (i) the "force feeding" the client customized commercials, as well as (ii) the customizing of any information (commercial or otherwise) that the client may volitionally seek by clicking on a hyperlink.

In its ability to manage hypervideo hyperlinks so that hyperlinking is customized, the present invention is of use to TV, cable and internet service providers (ISPs) who provide and/or who insert into streaming video (and hypervideo) advertisements, and/or hyperlinks to advertisements.

The best way of thinking about the present and related inventions is to completely abandon the idea that there is but one information source, and multiple parallel information sinks—as in broadcast television—and to instead realize that upon a digital communications network information flow control may be separated from information content, and that all sorts of information resources are "coming and going" to and from everywhere, and not necessarily concurrently, nor in linear time sequence, between all servers and all clients—much as the Internet functions today.

Network content providers, or Internet Content Providers, and/or ISP's may, in particular, insert "hard", linear, video clip commercials in video/hypervideo of their origination—although even this may not be a good idea if the program content is to be later "re-shown" (a better term for a network may be "reordered outside of anticipated time-of-viewing parameters").

Network Service Providers, or Content Service Providers, and/or ISPs may, in particular, control the immediate video servers from which the network Client SUVs directly obtain video/hypervideo—although certainly not all the same video/hypervideo, nor invariably synchronously, Indeed, some client SUVs are typically delivered multicast video/hypervideo, while others may be completely asynchronous. The video server might be considered to hold and store, for example, 48 hours of programming for 16 channels, delivering any and all on demand of an individual client. The ISP may well desire to "insert" local commercials automatically at scene transitions as video broadcasts flash by (from either live camera feed or video servers), seamlessly streaming out the video/hypervideo with its "inserted" advertisements to the client subscribers/users/viewers of the ISP.

In accordance with the present and related inventions, in order to (i) maximized the network economies of multicasting, while concurrently (ii) delivering custom commercials, commercials may be delivered to the various Client SUVs otherwise watching the same video/hypervideo at slightly different times. Suppose, as an extreme example for purposes of illustration, the network bandwidth is 3× and it requires 1× bandwidth to deliver a video/hypervideo content, and 1× to deliver a commercial. All Client SUVs commonly receive the same multicast video/hypervideo (if multicast, then at the same time) until a scene break near the nine minute elapsed mark. Only 1× of network bandwidth is required. Some Client SUVs then receive 30 second commercial A, and then pick up with the video. Other Client SUVs continue in the program video/hypervideo until near the ten minute mark, and then receive 30 second commercial B, then picking up again with the video/hypervideo. Finally, still other Client SUVs continue in the program video/hypervideo until near the eleven minute mark, and then receive 30 second commercial C. At the conclusion of commercial C all Client SUVs are back "in sync" with a single multicast video/hypervideo. The bandwidth required rose to 3× from approximately nine minutes to eleven minutes, thirty seconds, but was only 1× for other periods. Thus bandwidth is conserved.

Of course, in accordance with the present invention, the "insertion" is not of clips—as was postulated to be the case with the ICP and possibly several other places upon the network—but rather of hyperlinks. The inserted hyperlinks point, of course, to the special server. This special server can be the ISP itself but, for purposes of alleviating congestion, it may also be another, separate, server upon the digital communications network.

Wheresoever physically located, the special server—and the commercially valuable information that accumulates at this server regarding the ISP's clients—is normally controlled by the ISP. However, this special server can alternatively be controlled by something like an advertising agency, and the ISP is simply paid a flat rate for its services as a common carrier, or, at most some fee based on how many and how pliable are its Client SUVs as can be both (i) periodically "fed" commercials, and, wondrously, (ii) occasionally be induced to volitionally access a commercial and even (iii) buy in response to a commercial.

Accordingly, and in accordance with the present invention, hyperlinks that are eventually resolved to link to (typically local, typically focused) commercials are inserted by the ISP, and are resolved by the special server at the running time of the hypervideo tendered each Client SUV. Note that the special server does not, within a reasonable window of some days or weeks, care exactly when this transpires, and exactly when the hyperlink must be, and finally is, resolved.

The commercials ultimately resolved at the special server, and then accessed (from anywhere upon the entire network) by the Client SUV may be (i) static "web pages", (ii) regular video so as to create a relatively non-invasive commercial, or (iii) hypervideos which, although leaving the commercials non-invasive, makes the commercials interactive and potentially exciting for the user. Namely, the user can click in the hypervideo commercial to initiate a web transaction or to make a purchase.

From such feedback as may be gained (typically, but not exclusively, at the special server) by user-viewer(s) "click throughs" on inserted hypervideo commercials, subsequent on-the-fly commercial(s) insertion(s) may to be tuned to local demographic conditions and user profiles, or, preferably, even to an individual user-viewer.

2. The Mechanization of Custom Hyperlinks, and Custom Responses to Subscribers/Users/Viewers Click-Throughs on Hyperlinks

The present invention contemplates an interaction between, and a customization of, (i) the resolution(s) of hyperlinks inserted into digital video feeds, and (ii) a subscriber's recent activity in pursuing hyperlinks embedded in hypervideo.

In simplest terms, a particular subscriber may have voluntarily volitionally "clicked through" a video hyperlink (it

does not matter whether the hyperlink appears in a program or in a commercial) so as to follow, ultimately and indirectly (in accordance with the present invention) a hyperlink to, by way of example, an automotive manufacturer. It may thus be logically imputed that the subscriber is, at least momentarily, interested in cars, or in a particular car. The automotive manufacturer whose site was visited would logically desire to re-visit the subscriber with commercials. For that matter, other automotive manufacturers, worried that an interested subscriber might be sold an automobile by the competition, would also like to immediately get their advertisements to the attention of the subscriber. This process simply amounts to "striking while the iron is hot".

In accordance with the present invention, a party on the network, normally the special server (which may be, but is not normally, the network communications service provider), "keeps track" of the hyperlink "click throughs" of the subscriber. This much alone is not very profound. However, being able to do something the monitored "click throughs" is.

In accordance with the present invention, (hyper)links to ultimate (i) video clips, and/or (ii) hypervideo clips, and/or (iii) even more hyperlinks, will immediately, and likely nearly incessantly, be seamlessly fed back to a client subscriber/viewer/user once, and, importantly, yet again if (by hyperlinking) the client SUV permits. This concept is important. The special server of the present invention is not only a wise (and a patient, and a tireless, and an ever vigilant) "salesman", it is an incredibly persistent "salesman". A client SUV will tell it that he/she is interested in something just once and will thereafter not likely lack to be furnished information about it again and again.

In the extreme, a client SUV may click but once on, for example, but one auto advertisement in the morning and will thereafter be lucky if he or she sees anything but endless auto and auto dealer advertisements dynamically hyperlinked into received streaming video programming all the day long. This process amounts to "focused advertising".

3. A Server of DiQital Video Clips, Particularly Advertisements

A server of digital video clips, particularly advertisements, can access MPEG streams, available either (i) locally or (ii) by a Universal Resource Locator (URL) pointing to a server of clips (an Internet Content Provider of sorts). The server at which the clip (the advertisement) (optionally) resides may, or may not be, the same Internet Content Provider that provided the MPEG stream, or the same video/hypervideo server that distributed the stream. Normally the server of advertising clips is separate from both. It may be, and commonly is, associated with the advertiser (or his agent, the advertising agency).

Normally, the Internet Content Server that provides the MPEG stream also provides, as part of all of the "price" of receiving the stream, commercials, including embedded hypertext and hypervideo links, that are embedded within the video/hypervideo stream in a manner unavoidable by the Client SUV. This Internet Content Server that provides the MPEG stream still further specifies, and embeds within the MPEG stream, an insertion schedule for insertion of secondary programming within main, user-selected programming. The ISP, and/or the video server, may use this insertion schedule. Any secondary programming—typically in the form of MPEG streams as the user-viewers are typically but poorly responsive to static displays—is again available either locally or remotely as specified by a URL. The insertion schedule typically consists of entries for each insertion instance. Each entry specifies the access path name of the stream to be inserted, and a minimum number of video units after which this insertion can take place.

Both the primary programming (from the Internet Content Server that provides the MPEG stream) and the secondary programming (from the client SUV's Internet Service Provider) can, and typically do, offer the Client SUV a choice of multiple programming channels. The Client SUV can select a channel for ensuing playback from, and within, either the primary programming of the secondary programming. In this regard the Client SUV's control is not much different than television, where a channel can be changed during a show or during a commercial.

Note that the Client SUV-selected "channel", or MPEG stream containing programming, and be another "channel" or MPEG stream, or the same Internet Content Server that provided the first MPEG stream. This is very common. The SUV is offered, or enticed, to go from a more general to a more specific channel, or to go from one providing entertainment and/or education (so as to attract the Client SUV in the first place) to one providing such commercial feed as the Client SUV has, by his channel selection, indicated that he/she is willing to view. However, the successive main "channels" selected for playback at the Client SUV end need not be of the same Internet Content Server. In other words, more that one "network" may sometimes be received on, and from, a single Internet Content Server. Why should this be so? It is because if the SUV's Internet Service Provider does not provide him/her with the "channels" that he/she wants, then the Client SUV will likely soon have a new Internet Service Provider. This various MPEG streams as comprise the "channels" are always available either locally or as specified by a URL pointing to a Content Server.

Accordingly, under processes of the present invention, the Internet Service Provider can feed the Client SUV-selected MPEG stream to the Client SUV for playback. The Internet Service Provider can access, and can initialize for insertion, all secondary streams specified in the Insertion Schedule. The Internet Service Provider can seamlessly insert secondary streams within the main programming stream in the order, and at intervals, specified in the Insertion Schedule, feeding all such streams to Client SUV for playback. The Internet Service Provider can receive requests from a Client SUV to hyperlink to related videos, which are available either locally or are specified as a URL. The Internet Service Provider can access hyperlink video streams, initializing these streams and feeding them to the Client SUV for playback.

On completion of a hyperlink video stream, Internet Service Provider can automatically and seamlessly switch to the earlier playback stream, and can continue sending the new stream from the hyperlink point. The Internet Service Provider can accept successive requests to hyperlink, thus forming a hierarchy of video streams. On completion of a video, the Internet Service Provider can switch and return to playback of the video at the earlier, higher level.

Finally, the Internet Service Provider can reset and initialize all component modules on receiving a close request from the user-viewer.

These and other performance characteristics of the system and methods of the present invention will become increasingly clear with the explanation commencing in the following section 4 of this specification.

4. The Client Subscriber/User/Viewer

In accordance with the present invention, the Client subscriber/user/viewer (SUV), or simply Client, is offered a choice of multiple programming channels. One channel can be, and is, selected for playback. The Client SUV thus

conveys back to the Internet Service Provider of the Local Network Affiliate (that is also the Advertisement Server) the primary programming channel selected by the Client SUV for viewing. Immediately the ISP/LNA can tailer the advertisements later provided to (i) who the SUV is (or at least appears to be) and (ii) what the Client SUV has currently chosen to watch.

The Client SUV synchronizes with the ISP/LNA (or Advertisement Server) for reception of the user-selected primary programming channel.

The Client SUV plays back all programming received from the video server an MPEG stream. Additionally, any and all advertisements and messages from wheresoever upon the network received are inserted by the Client SUV into the primary programming channel as received, and are also seamlessly played back.

The computer system of the Client SUV—called a Video on Web VCR, or VOW VCR—can detect video scene changes in real-time; as video is being fetched and played back all scene transitions can be flagged automatically, and boundary frames for a scene noted.

The computer system of the Client SUV can generate a representative frame (also known as a keyframe) for a scene as delimited by its start and its end frames.

The computer system of the Client SUV can cache in temporary storage a portion of video being fetched, and can subsequently playback this video from cache buffers.

The computer system of the Client SUV can start recording digital video from the current play position, as a valid MPEG stream; and can stop recording when desired.

The computer system of the Client SUV can start recording digital video, as a valid MPEG stream, from the start of any scene cached in temporary storage and represented by a keyframe. Recording will continue, saving all video frames in cache as well as any new video frames being stored in cache, until stopped by Client SUV action.

The computer system of the Client SUV can receive and playback hybrid streams—primary programming interspersed with advertisements—that contain hypervideo information.

The computer system of the Client SUV can decode hypervideo information in the hybrid stream, and the (human) Client SUV can mark pre-authored objects of interest in playback video.

The computer system of the Client SUV provides visual cues to indicate an object of interest in a video as "hot" and thus selectable.

The computer system of the Client SUV can take a predefined action when an object of interest has been selected by the (human) Client SUV, typically by act of the (human) Client SUV to simply click on the object. A typical predefined action would be the playback of a different video, or the playback of a different segment from the same video or a connection to an Internet web site using its Universal Resource Locator (URL), or, as is most pertinent to the present invention, a link to a particular, addressable, portal of the special server.

If accessed, the special sever will typically return to the computer system of the accessing Client SUV a video/hypervideo to be played, or, more commonly, a URL pointing to a video-hypervideo to be requested and obtained across the network, and played. Thus the predefined action of clicking on a hotspot will ultimately cause the playback of a different video/hypervideo. If the special server directly issues the "playback" video/hypervideo, then this "playback" video/hypervideo may be accessible to the special server either locally, or through a Universal Resource Locator (URL) or an Internet Content Server.

There is the possibility of (i) no action on a Client SUV click-through to the special server. There may be no connection, or no video/hypervideo nor any further link available at the connection, or the hyperlink may simply intentionally be null.

There is the possibility of (i) delay at the special server in response to a Client SUV click-through. The special server, and/or the network resources that the hyperlink would be resolved to access, or to point to, may be busy. Although Client SUVs are not expected to like greatly delayed responses to clicking on hotspots, it is contemplated that a response can, if necessary, still be issued after some tens of seconds delay. The Client SUV simply continues in the past video-hypervideo stream in the interim.

The computer system of the Client SUV can receive from video/hypervideo server, and can play back, a new video that was selected though resolution of a hyperlink within the original, hybrid, programming stream.

The computer system of the Client SUV can playback a nested succession of videos; each video appears as a hyperlink within the earlier, higher level video. Upon completion of a video, the computer system of the Client SUV can seamlessly continue to playback the higher level video.

On action, the (human) Client SUV can close the connection with the video/hypervideo server and can thus end ongoing reception of the hybrid programming stream.

These and other performance characteristics of the system and methods of the present invention will become increasingly clear with the explanation commencing in the next following section 5 of this specification.

5. System Description

FIG. 1 is a schematic block diagram of a digital hypervideo communication system including the special dynamic hyperlink-resolving server, called a Video on Web Server, or VOW Server 1, in accordance with the present invention. As such, FIG. 1 diagrams the total content delivery environment in which the VOW Server 1 operates.

Live content 2 is produced by network content providers/producers 3, and is delivered onto the digital network 4 by the Internet Service Provider, or "ISP", 5. The content 2 is delivered by the ISP 5 onto what may be considered a high speed communications "cloud" in the form of the network 4, and this content 2 is consumed by client subscribers/users/viewers, or "SUVs", 7, most of whom are typically home SUVs. The ISP 5 in turn receives this content 2 from content providers/producers 3, either live or on stored media. The ISP 5 broadcasts this content 2 as live content or else makes it available in stored format on the video server 9. The VOW server 1 inserts local, rich, interactive commercial content using the dynamic hyperlink resolution and dynamic hyperlinking method of the present invention.

During delivery of content 2 onto the network by the ISP 5, the delivered hypervideo is stored upon the video server 9 and delivered on demand to the SUVs 7. The delivery may be in any part multicast (meaning to more than one SUV 7 at the same time). The delivery is by definition multicast if the hypervideo content is from a live video feed. Hotspots and associated hypervideo links, or hyperlinks, are always first delivered in the streaming hypervideo from the video server 9.

The hotspots and associated hyperlinks, which are typically links to advertisements or advertising-related promotions (directly, or indirectly in accordance with the present invention the explanation of which is ensuing) may be inserted either into stored, or into live, video content 2. Of course, if inserted into live video then the hotspots and associated hyperlinks have to be so inserted in real time. A

companion patent application for REAL-TIME TARGETED INSERTION OF VIDEO CLIPS, HYPERVIDEO CLIPS AND/OR HYPERLINKS IN COMPRESSED STREAMING VIDEO, INCLUDING DYNAMICALLY AT MULTIPLE POINTS BETWEEN CONTENT PROVIDERS AND SUBSCRIBERS IN DIGITAL NETWORKS teaches how this is done. The hot links and associated hyperlinks may be inserted into hypervideo that goes to as few as one single SUV **7**, or into hypervideo that is multicast to many SUVs **7** at the same time. In other words, any individual Client SUV may rarely be receiving hyperlinks that are custom (if not also hotspots that are also custom, which is rarer still.) Normally, however, in accordance with the present invention many Client SUVs, especially those linked by geography or demographics or other affinity grouping, will be receiving at least some of the same (i) hotspots and (ii) associated hyperlinks. Note that these Client SUVs need not receive these same (i) hotspots and (ii) associated hyperlinks at the same time. Moreover, and in accordance with the invention presently being explained, an initial receipt of the same (i) hotspots and (ii) associated hyperlinks at each of several Client SUVs does not necessarily mean that, should each "click through" on a hotspot/hyperlink, that each will ultimately access the same network resource.

The connection of the ISP **5**, and also the SUVs **7**, to the high speed network **4**, or, typically, the internet, can be through any of (i) a cable modem network, (ii) a satellite network, and/or a (iii) ADSL (a telephone network).

The SUVs **7** are necessarily connected to the network, typically the internet and more typically the world wide web, through a high-speed link—normally, a cable modem—in order to support video/hypervideo. The SUVs **7** each independently view and interact with the hypervideo (and other video and downloaded content) through a software-based functionality called, for purposes of continuity with the previous acronym of "VCR" (i.e., a Video Cassette Recorder), a "Video On Web Video Cassette Recorder" (although no cassette likely exists), or simply a "VOW VCR". The function of such a VOW VCR is taught in a companion patent application. Basically it behaves like a VCR to play and record video with the added function that it can respond to click-throughs on hotspots to interpret and respond to associated hyperlinks—normally by going out onto the network **4** to a designated URL, and most normally to (some portal of) the VOW server **1**.

FIG. **2** shows the flow of events from a software-component-point-of-view of the architecture. The receipt of Client SUV activity triggers the flow. This activity is typically a Client SUV click through but also can be a timed event on the Client SUV side, or an event associated with the playback of video by the Client SUV. The server receives the necessary information such as the Client SUV identification, current stream, current position in the playback and event type and invokes the appropriate sub-program. The VOW Server checks if the appropriate sub-program is loaded and, if required, loads the sub-program and passes the information received from the client. The sub-program in turn passes the information to the appropriate COM object which performs the core processing by looking up the database and also, if necessary, updating it.

A block diagram of the production of hypervideo—containing both (i) hotspots and (ii) associated hyperlinks—at an authoring station in the content provider (shown in FIG. **1**) is shown in FIG. **3***a*. This first step involves content preparation. A network content provider **2** (shown in FIG. **1**) operates software at an Authoring Station, such as the authoring system of the related patent application, to modify a video stream, the MPEG stream **21**, to produce and authored MPEG stream auth.mpeg **22**. The authored stream auth.mpeg **22** contains both (i) hotspots and (ii) associated hyperlinks. The (ii) associated hyperlinks are of two types: a 1) first, or static, type and a 2) second, or dynamic, type.

FIG. **3***b* through FIG. **3***d* illustrate the basic mechanism of the dynamic hyperlink resolution, and dynamic hyperlinking, process of the present invention.

Referring to FIG. **3***b*, a second step is content delivery. The client SUVs **7** stream in the video auth.mpg **22**. If the link is of type A, client directly goes to the specified URL. If the hyperlink is of the first, or static, type 1), then the client SUV **7** goes directly to the URL specified by the hyperlink. If the hyperlink is of the second, or dynamic, type 2), then the client SUV **7** also goes directly to the URL specified by the hyperlink, but this URL is commonly (a portal of) the VOW Server **1**.

Referring to FIG. **3***c*, the third step is dynamic Hyperlink resolution. The VOW server **1** resolves the link and sends a URL back to the Client SUV **7**. It also logs the request.

Referring to FIG. **3***d*, the fourth step is when the Client SUV **7** fetches the video/web page/slide show using the resolved hyperlink. The Client SUV typically fetches this video or other URL resource from the video server **9**, or from yet another site on the network **4**.

During all this process, and the viewing of hypervideo, the hypervideo is preferably presented at the VOW VCR of each SUV **7** substantially as is shown (for a first, primary, screen out of several potential such screens) in FIG. **4**. The manner of realizing this screen, and the associated functionality, is taught within the companion patent application. For the moment, however, it needs only be understood that the "video-on-web" VCR, or "VOW VCR", acts as a web-based playback client through which a SUV **7** can select channels, just as the SUV might with a normal TV, so as to play back hypervideos or just plain videos. In so doing the VOW VCR presents the usual VCR-like controls **71** for video play back including fast-forward, pause, rewind and fast-reverse. The Client SUV **7** uses a simple cursor (not visible in FIG. **4**) to control the playing of stored videos, whereas for live videos clicking on an simple play-and-pause control suffices.

When playing hypervideos the VOW VCR displays the main video in one screen, as at screen **72**. Hotspots present—and hotspots are neither always nor invariably present—are displayed as is exaggerated, for ease of recognition in the drawing, at hotspot **73**. A text annotation (not shown in FIG. **4**) preferably appears about the object when the SUV **7** does a mouse-over on the object. These annotations can beneficially serve to impart additional, supplemental, information about the scene and/or the objects in it and/or the hotspot, such as, for example, the identity of a particular person in a depicted group of persons. More commonly, however, the annotation is, or includes, or indirectly links, a Universal Resource Locator, or URL. If the SUV **7** clicks on the hotspot **73** that is associated with a URL directed to the VOW sever—and most are—then the video-on-web VCR (the "VOW VCR") will jump to the VOW Server **1** (shown in FIG. **1**).

Third, the SUV **7** can click on a record button, and can then record the video starting at the current frame locally on his hard disk or other media provided that security privileges allow him or her to do so.

In so performing the VOW VCR display thumbnail images **74** of scenes which have been defined and delineated at the video server **9**. See the companion patent application.

In the case of "canned" video, these scene changes may well have been manually detected, and the scene change boundary markers long since inserted by an editor sitting at a console so as to annotate the video not in real time. In the case of "live" video as is typical of, inter alia, news broadcasts, the scene change boundaries are automatically detected at the video server **9**, and the associated hyperlinks (if any, and which may be sparse in number) inserted much in the contemporaneous manner of a court reporter, or of a translator. The inserted hyperlinks may be less numerous, less well focused, less wide-ranging, and/or less versatile in a live video feed. For example, consider a newscast, and particularly the newscast sports segment. A (network) broadcast "station" employee at a computer station has readily to hand certain hyperlinks to baseball, football, basketball and hockey—if only to the league web sites where the team scores are posted. As the sports commentary and/or sports scores unfold in the live videocast, minor link insertions by this employee serve to "hyperlink annotate" this portion of the news.

At any time about twenty-one most recent such thumbnail images **74**, representing twenty most recent scenes will displayed. When a new scene is detected it enters the lowest corner while the oldest scene is discarded in a first-in, first-out (FIFO) fashion. The video corresponding to these twenty scenes is also buffered in FIFO fashion on local storage. The SUV can click on any of the scenes to start recording from that scene. The implication of this is that the SUV can record video which has gone by; such as a sports action shot or a talk-show dialogue.

Returning to FIG. **1**, the premises of the ISP **5** typically contain both (i) one or more video server **9** and (ii) the VOW Server **1**. Either server can, of course, be physically located elsewhere on the network **4**.

A schematic block diagram of the architecture of a portion of the preferred embodiment of a system in accordance with the present invention (as was previously diagrammatically shown in FIG. **1**) is shown in FIG. **5**. This portion includes (i) the network content provider **2**, (ii) the network "video on web" control server, or VOW Server **1** which is commonly physically located at the ISP **5**, and (iii) the "video on web VCRs", or "VOW VCRs" of the client SUVs **7**, and (iv) the network **4**. The video stream **91** originates at the video server **9**; the control stream **11** at the VOW Server **1**. Both streams **91**, **11** are synchronized, and are received at the VOW VCR of a client SUV **7**. More particularly the video stream **91** is received at the player module **71** of the VOW VCR of a client SUV **7** while the control stream **11** is received at the control module **71** of the VOW VCR of a client SUV **7**. Both player module **71** and control module **11** will be understood to be software functions.

A diagrammatic view illustrating that a Client SUV whose VOW VCR is playing hypervideo may click on a hotspot to branch to a network page display, or "web page", is illustrated in FIG. **6**.

Likewise, a diagrammatic view illustrating that a Client SUV whose VOW VCR is playing hypervideo may click on a hotspot to alternatively branch to another video, or hypervideo, is illustrated in FIG. **7**.

Finally, a diagrammatic view illustrating that a Client SUV whose VOW VCR is playing hypervideo may click on a hotspot to alternatively branch to—by way of example among many different network resources two of which have already been diagrammatically illustrated in FIGS. **6** and **7**—a slide show is illustrated in FIG. **8**.

A top-level software flow chart of the VOW Server of the present invention, by which software a Client SUV hyperlink "click-through" request is dynamically resolved, is shown in FIG. **9**.

Second-level software flow charts of the sequence of processing the Client SUV hyperlink "click-through" request in the VOW Server of the present invention are shown, respectively for the processes "A" and "B" identified in the top-level flow chart of FIG. **9**, respectively in FIGS. **10** and **11**.

FIG. **9** shows the overall flow in the main branch of processing. The information from the client is passed on to the user progression tracker module which is responsible for keeping track of user navigation in hypervideo click-throughs and playback status of the user. The progression tracker "follows" the user when he navigates through hypervideo and takes decisions about which links have to be supplied next to the user by calling various processing modules. It is mostly an entity which depends on time and determines if the user is currently watching a commercial, if so, for how long, whether the user has paused the video and if so for what duration, and so on. There are two main special actions that the progression tracker can take apart from the main function pertaining to advertisement servicing. They are: a decision to award a prize or coupon to the user or a security decision (or branch, both of which are described in subsequent paragraphs). The main branch then continues to retrieve the next set of commercials and their associated links (including a prize winning coupon link if told to do so by the right branch). The main branch checks if any scene annotations need to be conveyed to the user, then checks for text information to be rendered and then dispatches all this control information (including the list of commercials) to the user.

FIG. **10**, or the branch "A" processing occurring in the main loop of FIG. **9**, shows how the hotspot linking is used to control security and access to videos. In this case, the access is of a 'blocking' type—in the sense the client does not proceed until it has an answer from the VOW server or the user cancels the access. This feature is mainly used for controlled access to videos and for commercial purposes—including e-commerce transactions and implementing pay-per-view schemes. In controlled access scenarios it is mainly used to restrict child access to restricted adult material. The branch "A" is entered when a security or e-commerce type of click is received. The server proceeds to retrieve the security information initiates a dialogue with the client. If validation returns an affirmative answer, the server proceeds to give the links to restricted videos along with access keys. A similar situation occurs if the access is to a pay per view video. If the click is on a e-commerce transaction, the necessary steps to complete that transaction are completed.

FIG. **11**, or the branch "B" processing occurring in the main loop of FIG. **9**, outlines the decision to award a user a coupon or prize when he/she clicks on a hotspot in the commercial. Essentially, this module keeps a count of the number of times the user accesses the particular commercial. If the count is greater than a certain value it qualifies the user for a selection (which might be a random or may employ any other scheme awards that user a prize or coupon. The count is also recorded in the database to give the advertiser statistics on the number of user accesses to his commercial.

This mechanism will also be used to award or inform or take some special action when the user clicks on a non-commercial hypervideo. If the flag has already been set i.e in the left branch of the figure, the win is recorded and an e-mail or other suitable is employed to make the user aware that he has won a coupon or prize. In the right branch of the figure which illustrates the process when the access flag has

not yet been set. What happens in this branch has been summarized in the preceding paragraph.

Thus FIG. 1 has shown a block schematic of the video server, the VOW server, the client and the network on which these components are connected. FIG. 5 has illustrated the flow of data on the same network 'pipe' from video server to the playback module of the client and the control stream flowing to the control module of the client. Both these streams are drawn or pulled by the respective modules on the client.

The steps starting from the preparation of the authored MPEG stream to actual playback of dynamic hyperlinks have been described. The first step is where objects in video are tracked and marked as hotspots and then associated with hyperlinks which can be either static or dynamic. However, the focus of this disclosure is the concept of dynamic hyperlinks and their use for interactive commercials. When the client plays back the stream, it identifies dynamic links in the stream, co-ordinates with its control module which would have fetched the required links (at playback time) and plays back the appropriate streams from the video server.

This dynamic form of linking, meaning that the link is decided at playback time, is the theme of the present invention. This concept can be used in several different ways, specifically detailed in various parts of this disclosure. The principle focus is the usage of the concept of dynamic hyperlink resolution for (i) timely (i.e., non-stale) delivery of (ii) Client SUV-specific interactive commercials, using the VOW sever as the vehicle for delivery.

The scheme of the present invention opens up new opportunities for businesses to attract new markets in a highly customized fashion, through interactive discount offerings, coupons and prize schemes. In addition, it helps the advertiser to develop statistics on everything from (i) click-throughs of all Client SUVs to particular hyperlinks, to (ii) the click-throughs of some particular Client SUV to particular hyperlinks, to (iii) the ensuing conduct, potentially including on-line purchases and submissions and expressions of interest, of a particular Client SUV is following a particular hyperlink. This is in marked contrast to conventional broadcast television where there is no interactivity with the viewer and/or the viewer's video playback, especially including commercials.

6. Recapitulation of the Invention

This present specification has described hyperlink resolution at and by a special network server in order to enable diverse sophisticated hyperlinking upon a digital network streaming digital hypervideo from a network hypervideo server to network clients. The special server operates in conjunction with (i) a network video server and (ii) a special client called a VOW VCR (which VOW VCR is described in a separate patent application).

The objectives of the present invention, and of the special server, are as follows. It acts as a tool to insert customized hypervideo, normally commercials, in the hypervideo streams that are displayed at individual network Client subscriber/users/viewers (Client SUVs). It serves to resolve hyperlinks at run time, i.e., to process user clicks on objects in hypervideo (including, but not limited to, advertisements) so as to determine the link to which the Client SUV will go to, or a network resource which the Client SUV will access. This process is referred to as 'dynamic hyperlink resolution'.

This concept of dynamic hyperlink resolution may be used to implement, for example, a lottery, a contest, or a coupon distribution. It permits of interactive commercials hitherto unseen in streaming digital video or in television media.

The dynamic hyperlink resolution may be used to supply security information to, and to enforce security restrictions on, the VOW VCR of the Client SUV; such as whether the Client SUV has the authority to record a particular clip or not, or whether he/she can jump to a particular clip on a hyperlink or not. This is similar to a pay-per-view situation where a presentation cannot be seen unless paid for.

Finally, the dynamic hyperlink resolution serves to record Client SUV click-throughs, and to use this information o develop statistics on Client SUVs both collectively and, importantly, individually.

The overall architecture of the system was seen in FIG. 1. The control stream was generated by the special server, called a VOW Server, that qualified and added value to the video stream generated by the video server. Both streams were drawn by each Client SUV, the control stream being synchronized with the video stream. The video stream could either be generated live—such as by an encoder plus a camera system—or could be delivered from secondary storage—such as a hard disk. In general, the video stream contained static information such as the tracked information of objects in a hypervideo stream while the generated control stream contained dynamic information such as the hyperlinks.

The block diagram of the VOW Server was seen in FIG. 6. As stated earlier, the hyperlinks are dynamically resolved in this software function based on which Client SUV is clicking on what hyperlink, and the time of the clicking.

The process of dynamic hyperlinking was seen to be as follows: The Client SUV clicks on a "hot spot" object in the hypervideo, say an "object 1". This action is conveyed back to the VOW Server by the client software, the VOW VCR.

The VOW Server (a software process) sends the Client SUV time and action information to its resolution component. The resolution component uses the data and retrieves an appropriate link to an advertisement, a pointer (link) to a network resource, or a link to a response. The response could be, for example, an announcement of a contest of a lottery result: "you've just won a trip to Hawaii", or "you've won a free dinner for two at the Greek restaurant". A link to an appropriate video, hypervideo or network resource is thus conveyed back to the Client SUV—which the Client SUV sees and uses to decide his or her future course of action.

The control generation module of the VOW Server is responsible for taking in the various SUV actions and generating the control stream based on various data it retrieves from the various sub modules, all as was shown in the flow charts.

Notably, there must have been, and there is, a necessary preparation of hyperlinks before they are available—even in common—to be exercised at the Client SUVs. In particular, a scene change module functions as taught within a related patent application to recognized (in real time!) the scene change boundaries of streaming digital video. The videos stored on the server are indexed in terms of scenes, with a text annotation added to each of these scenes. The VOW Server stores a list for each of these MPEG streams. Each item in the list consists of two fields: 1) one field is the frame number of the scene change point being authored and 2) the other has the annotation (the text string) corresponding to it.

As the VOW VCR software process at the Client SUV proceeds through the video, it will receive, as part of the stream from the video server, the scene change frames and their corresponding text annotations. On the client side the client player (the VOW VCR) displays a thumb nail image of a characteristic (first) scene frame, and further displays the text annotation when the user does a mouse-over on the

thumb nail image. A timer module was responsible for timing the insertion of the commercials.

It is thus possible to understand how the hyperlinks come to exist in the first place. Returning now to the functions more directly performed by the VOW Server of the present invention, this VOW Server runs)as a software process) a user data module and advertisement component stored the Client SUV profile and information such as age, sex and interests. This profile and information was used by the advertisement component to select an appropriate commercial for the Client SUV. The user data module and advertisement component also kept track of the commercials clicked by the Client SUV so that overall statistics can be extracted out of the advertisement component as regards the Client SUV behavior for the commercials. The advertisement component was thus responsible for retrieval of the appropriate ad or other response to a particular Client SUV, making its decisions based on the previous data for that Client SUV and also global information. Third party components for this particular advertisement component, if suitable, may also be substituted for this function. For example, Client SUV preferences might be recorded and interpreted based on heuristic, or on fuzzy logic, filters.

In addition, the control stream generation module was able to generate security information for the video stream which controlled whether the video could be recorded or not at the client.

In accordance with the preceding explanation, variations and adaptations of the system and methods of the present invention for real-time targeted insertion of video and hypervideo clips and hyperlinks in compressed streaming video (including dynamically at multiple points between content providers and subscribers in digital networks) will suggest themselves to a practitioner of the digital communications arts and sciences.

In accordance with these and other possible variations and adaptations of the present invention, the scope of the invention should be determined in accordance with the following claims, only, and not solely in accordance with that embodiment within which the invention has been taught.

What is claimed is:

1. A method of resolving hyperlinks present in hypervideo distributed upon a digital communications network, the method comprising:

distributing from a first, hypervideo, network server upon a digital network to each of a multiplicity of network client subscribers/users/viewers digital hypervideo containing hyperlinks that link when exercised to a second, hyperlink-resolving, network server;

selectively exercising at the network client subscribers/users/viewers the hyperlinks so as to cause communication linkage upon the network to the second, hyperlink-resolving, network server;

resolving at the second, hyperlink-resolving, network server all received, selectively-exercised, hyperlinks in consideration of the individual network identities of the hyperlink-exercising client subscribers/users/viewers and, consequent to this resolving, communicating back across the digital network to the hyperlink-exercising and communicating client subscribers/users/viewers linkage information that is not identical for all, but that is instead different for at least two of these hyperlink-exercising and communicating client subscribers/users/viewers; and

receiving at the hyperlink-exercising and communicating client subscribers/users/viewers linkage information from the second, hyperlink-resolving, network server, and acting upon this linkage information to access resources upon the network;

wherein the resources accessed by at least two of the hyperlink-exercising and communicating client subscribers/users/viewers are different nonetheless to the fact that the hyperlinks within the hypervideo originally distributed to both were the same.

2. The method of resolving hyperlinks according to claim 1

wherein the interpreting at the second server is so as to communicate back across the network information in the nature of a network universal resource locator to the hyperlink-exercising client subscribers/users/viewers.

3. The method of resolving hyperlinks according to claim 1

wherein, consequent to the receipt of the information at the hyperlink-exercising and communicating client subscribers/users/viewers, the resource is retrieved upon the network.

4. The method of resolving hyperlinks according to claim 1

wherein, consequent to the receipt of the information at the hyperlink-exercising and communicating client subscribers/users/viewers, the resource is retrieved locally, within the client subscribers/users/viewers.

5. A method of resolving hyperlinks present in hypervideo distributed upon a digital communications network, the method comprising:

communicating streaming digital hypervideo containing hyperlinks upon a digital network from a first, hypervideo, server to each of a multiplicity of network client subscribers/users/viewers where at least two client subscribers/users/viewers receive the same hyperlink;

selectively exercising at at least two of the network client subscribers/users/viewers the same hyperlink so as to cause these exercising client subscribers/users/viewers to communicate upon the digital network to, in accordance that the exercised hyperlinks are the same, a same port of another, second, network server;

receiving at the port of the second network server notification of the exercised hyperlink from each of the at least two client subscribers/users/viewers so exercising the same hyperlink;

interpreting at the second server all received exercised hyperlinks in consideration of the individual network identities, known to the second server, of the hyperlink-exercising client subscribers/users/viewers and, consequent to this interpreting, communicating back across the digital network to the hyperlink-exercising and communicating client subscribers/users/viewers information that is not identical for all, but that is instead different for at least two, of the hyperlink-exercising and communicating client subscribers/users/viewers as did exercise the same hyperlink; and

receiving at the hyperlink-exercising and communicating client subscribers/users/viewers the information that is different for at least two of these hyperlink-exercising and communicating client subscribers/users/viewers as did originally exercise the same hyperlink, and, consequent to the receipt of this information, retrieving a resource in accordance therewith, the different information leading to different resources so that at least two of the hyperlink-exercising and communicating client subscribers/users/viewers that originally exercised the same hyperlink do not retrieve the same resource but, instead retrieve different resources;

wherein at least some hyperlink-exercising client subscribers/users/viewers, nonetheless to originally exercising the same hyperlink, ultimately retrieve different resources.

6. The method of resolving hyperlinks according to claim 5

wherein the interpreting at the second server the received exercised hyperlinks is further in consideration of additional data individually associated with each of the hyperlink-exercising client subscribers/users/viewers, the identities of which hyperlink-exercising client subscribers/users/viewers are known.

7. The method of resolving hyperlinks according to claim 6

wherein the interpreting is further in consideration of additional data of the nature of demographic data.

8. The method of resolving hyperlinks according to claim 6

wherein the interpreting is further in consideration of additional data of the nature of socioeconomic data.

9. The method of resolving hyperlinks according to claim 6

wherein the interpreting is further in consideration of additional data of the nature of credit data.

10. The method of resolving hyperlinks according to claim 6

wherein the interpreting is further in consideration of additional data of the nature of hypervideo-viewing preference data previously expressed by the individual client subscribers/users/viewers.

11. The method of resolving hyperlinks according to claim 6

wherein the interpreting is further in consideration of additional data of the nature of past hyperlinks exercised by the individual client subscribers/users/viewers.

12. The method of resolving hyperlinks according to claim 11 further comprising after the interpreting:

updating at the second server a database of information concerning past hyperlinks exercised by the individual client subscribers/users/viewers in consideration of the hyperlink just exercised, and just interpreted.

13. A digital communications network distributing hypervideo with embedded hyperlinks comprising:

a digital communications network;

a first, hypervideo, network server distributing upon the network to each of a multiplicity of network client subscribers/users/viewers digital hypervideo containing hyperlinks that link when exercised to a second, hyperlink-resolving, network server;

a multiplicity of network client subscribers/users/viewers upon the network receiving thereupon the hypervideo from the first, hypervideo, network server, and selectively exercising the hyperlinks so as to cause communication hyperlinking upon the network to the second, hyperlink-resolving, network server;

a second, hyperlink-resolving, network server resolving all received, selectively-exercised, hyperlinks in consideration of the individual network identities of the hyperlink-exercising client subscribers/users/viewers and, consequent to this resolving, communicating back across the digital network to the hyperlink-exercising and communicating client subscribers/users/viewers linkage information that is not identical for all, but that is instead different for at least two of these hyperlink-exercising and communicating client subscribers/users/viewers; and

wherein the hyperlink-exercising and communicating client subscribers/users/viewers, upon receiving the linkage information from the second, hyperlink-resolving, network server, do act upon this linkage information to access resources upon the network;

wherein at least two of the hyperlink-exercising and communicating client subscribers/users/viewers do access different resources upon the network nonetheless to the fact that the hyperlinks within the hypervideo originally distributed to both were the same.

14. A computerized process performed at a digital communications network server in response to receipt of notice from a particular client subscriber/user/viewer out of many subscribers/users/viewers upon the network to the effect that the particular client subscriber/user/viewer has volitionally selected a hyperlink, the process comprising:

comparing (i) a unique identity of the particular client subscriber/user/viewer who has volitionally selected the hyperlink with (ii) a pre-existing database of information regarding, inter alia, the particular client subscriber/user/viewer; and

choosing and providing a response to the particular client subscriber/user/viewer in accordance with the information stored within the pre-existing database of information;

wherein the process is called "dynamic hyperlink resolution": because the response to each subscriber/user/viewer who has selected the same hyperlink is not the same for all subscribers/users/viewers, but is dependent upon the individual one subscriber/user/viewer.

15. The process according to claim 14

wherein the choosing and providing is of a response in the form of universal resource locator.

16. The process according to claim 15

wherein the chosen and provided response in the form of universal resource locator is directed to an advertisement targeted to the particular client subscriber/user/viewer.

17. The process according to claim 15

wherein the chosen and provided response in the form of universal resource locator is directed to a coupon targeted to the particular client subscriber/user/viewer.

18. The process according to claim 15

wherein the choosing and providing is of a response in the form of a control signal and accompanying information to the client subscriber/user/viewer.

19. The process according to claim 18

wherein the chosen and provided response in the form of a control signal and accompanying information causes branching by the particular client subscriber/user/viewer.

20. The process according to claim 18

wherein the chosen and provided response in the form of a control signal and accompanying information causes a display by the particular client subscriber/user/viewer.

21. The process according to claim 14 further comprising:

running a contest of skill among the collective notices of all subscribers/users/viewers who do timely volitionally select a particular hyperlink;

wherein the choosing and providing is of a response in the form of a win/lose notification of the contest.

22. The process according to claim 14 further comprising:

running a lottery of chance among the collective notices of all subscribers/users/viewers who do timely volitionally select a particular hyperlink;

wherein the choosing and providing is of a response in the form of a win/lose notification of the lottery.

23. The process according to claim 14

wherein the choosing and providing is of a response in the form of a dunning notice targeted to the particular one subscriber/user/viewer who has not paid his or her bill from the network service provider.

24. The process according to claim 14

wherein the choosing and providing is of a response in the form of a pay-per-view video presentation.

25. The process according to claim 14 further comprising:

keeping track of the notice from the particular subscriber/user/viewer, and other notices from the same subscriber/user/viewer, as accumulated information revealing the preferences and the activities of the particular subscriber/user/viewer.

26. The process according to claim 25 further comprising:

providing hyperlinks in the first instance to the particular subscriber/user/viewer in consideration of previously accumulated information regarding the preferences and the activities of the particular subscriber/user/viewer.

27. In a digital communications network where hypervideo containing hyperlinks is communicated from a digital hypervideo server to a client subscriber/user/viewer, a method of resolving a exercise of a particular hyperlink by a particular client subscriber/user/viewer out of many such subscribers/users/viewers upon the network, the method comprising:

communicating the exercise of the particular hyperlink by the particular client subscriber/user/viewer over the network to a control server where is stored (i) all hyperlinks and (ii) information in respect of all subscribers/users/viewers;

providing across the digital communications network to the particular client subscriber/user/viewer a universal resource locator in accordance with (i) the exercised hyperlink, and (ii) the stored information;

using at the client subscriber/user/viewer the universal resource locator received across the digital communications network to access a network resource;

wherein the process is called "dynamic hyperlink resolution": because the universal resource locator provided each subscriber/user/viewer who has selected the same hyperlink is not the same, but is instead dependent upon the stored information.

28. The method according to claim 27

wherein the provided universal resource locator is to an advertisement in respect of the individual client subscriber/user/viewer exercising the hyperlink.

29. A computerized security process performed at a network service provider providing upon a communications network hypervideo to each of a multiplicity of subscribers/users/viewers upon the network, the process comprising:

receiving upon a digital communications network communicating hypervideo notice from a particular client subscriber/user/viewer out of many subscribers/users/viewers of hypervideo upon the network to the effect that the particular client subscriber/user/viewer has volitionally selected a hyperlink;

comparing (i) a unique identity of the particular subscriber/user/viewer to whom the hypervideo has been supplied with (ii) a pre-existing database of information regarding, inter alia, the preferences of each individual subscriber/user/viewer; and

choosing and providing a particular hyperlink to the particular subscriber/user/viewer in accordance with the information that was stored in the database regarding that particular subscriber/user/viewer;

wherein no subscriber/user/viewer will receive hyperlinks offensive to or inconsistent with pre-existing information regarding that subscriber/user/viewer, and, instead, each subscriber/user/viewer will receive only hyperlinks that are consonant with and in respect of the pre-existing information regarding that subscriber/user/viewer.

30. A computerized security process according to claim 29

wherein the comparing is to a pre-existing database of information regarding, inter alia, the status of accounts of each individual subscriber/user/viewer;

wherein hyperlinks to added cost services are omitted from hypervideo network communicated to subscribers/users/viewers whose accounts are in arrears.

31. A computerized security process according to claim 29

wherein the comparing is to a pre-existing database of information regarding, inter alia, the acceptability of information of certain types to each individual subscriber/user/viewer;

wherein hyperlinks to information of certain types are omitted from hypervideo network communicated to subscribers/users/viewers who do not find such types of information acceptable.

* * * * *

APPENDIX B

A copy of U.S. Patent No. 5,155,591 issued to Wachob.

US005155591A

United States Patent [19]

Wachob

[11] Patent Number: 5,155,591

[45] Date of Patent: Oct. 13, 1992

[54] METHOD AND APPARATUS FOR PROVIDING DEMOGRAPHICALLY TARGETED TELEVISION COMMERCIALS

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[73] Assignee: General Instrument Corporation, Hatboro, Pa.

[21] Appl. No.: 425,117

[22] Filed: Oct. 23, 1989

[51] Int. Cl.[5] A04N 7/08; A04H 1/02

[52] U.S. Cl. 358/86; 455/4.2; 455/6.2

[58] Field of Search 455/2, 3.1, 3.2, 3.3, 455/4.1, 4.2, 5.1, 6.1, 6.2, 6.3, 67.1, 67.2, 67.3; 358/84, 86

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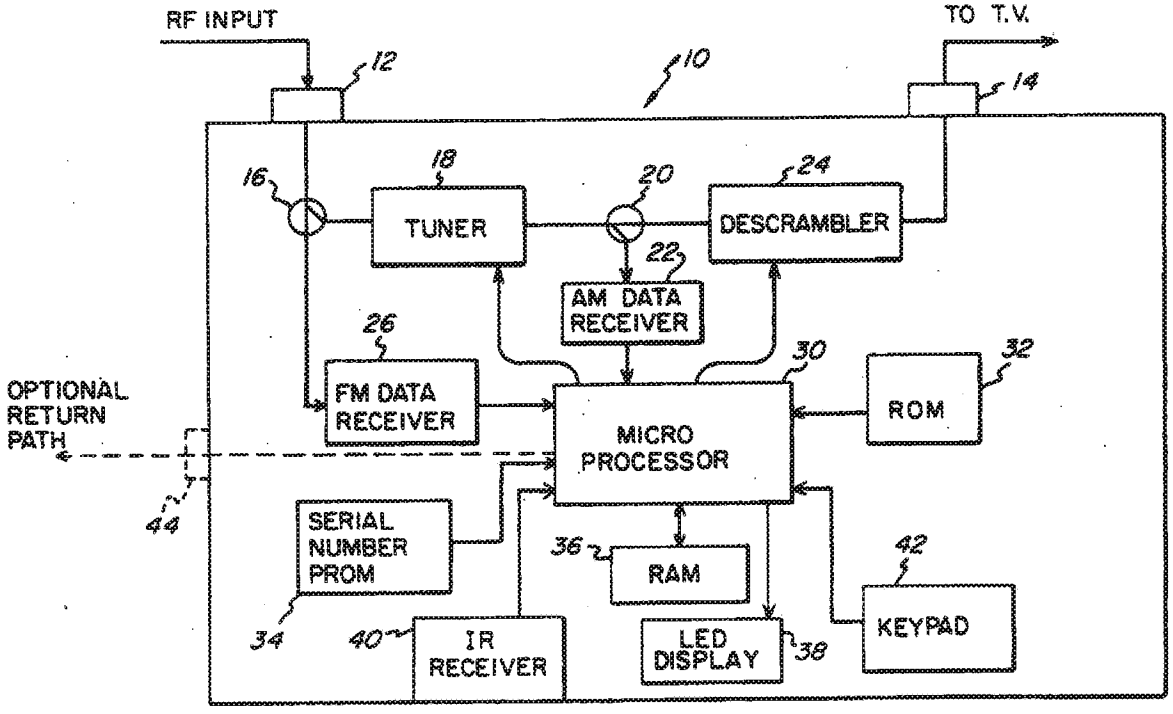
Primary Examiner—Reinhard J. Eisenzopf
Assistant Examiner—Lisa Charouel
Attorney, Agent, or Firm—Barry R. Lipsitz

[57] ABSTRACT

Different commercial messages are broadcast to different demographically targeted audiences in a cable television system or the like. A first television channel contains television programs and periodic commercial messages. A second television channel contains alternate commercial messages. Demographic characteristics of a viewer are identified, and commercial messages are selectively provided from the first or second channel, depending upon the viewer's demographic characteristics. Demographic data can be input by a viewer via a remote control, downloaded to a subscriber's converter from a remote headend, or programmed into the converter at installation. Prioritization of the demographic characteristics of a plurality of television viewers watching a program together enables commercials to be targeted to the viewer having highest priority. Statistical data can be maintained concerning the number and identity of subscribers viewing specific commercials.

10 Claims, 7 Drawing Sheets



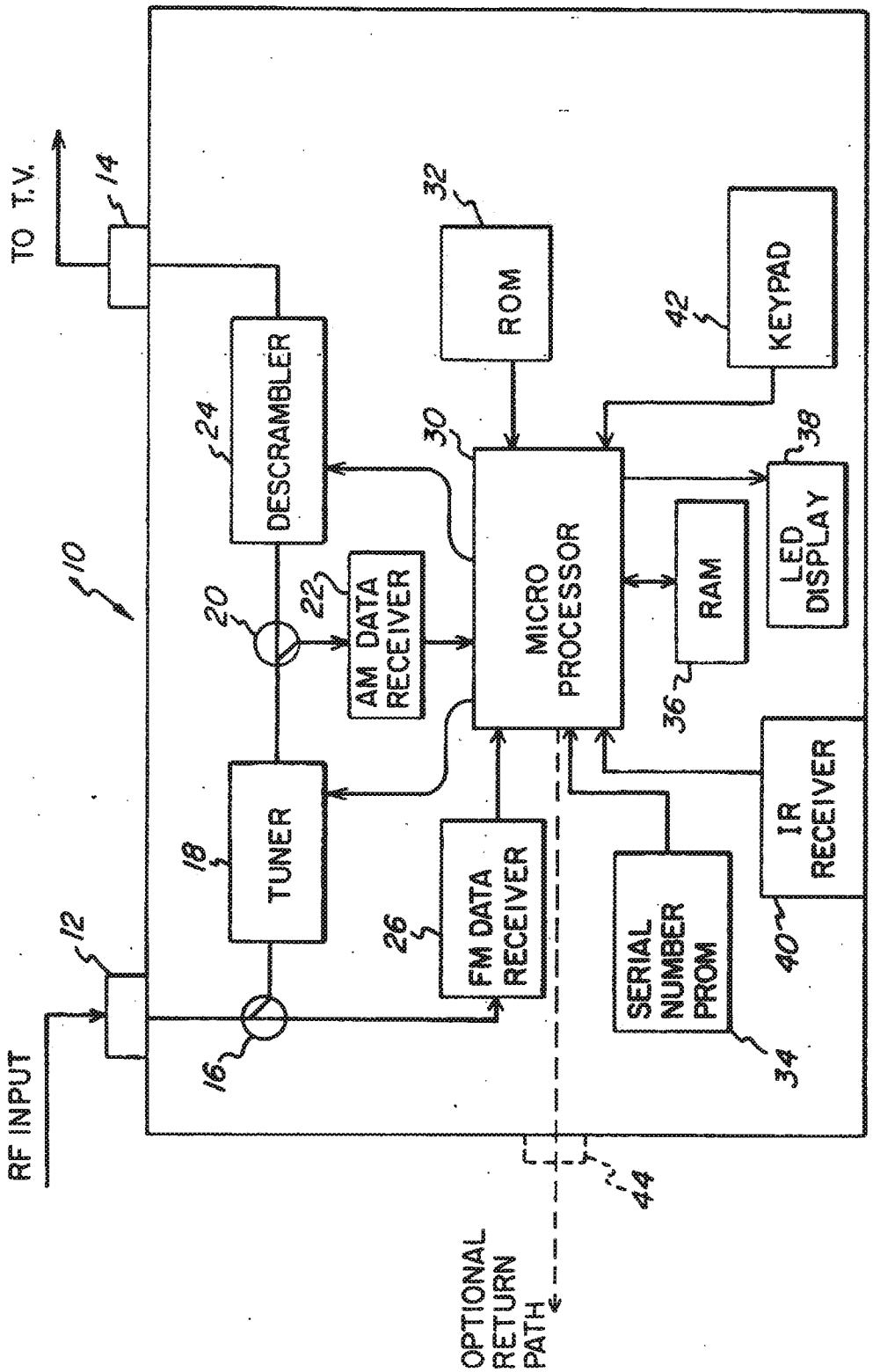

TO T.V.
14
32
ROM
42
KEYPAD
24
DESCRAMBLER
30
38
10
20
22
AM DATA RECEIVER
MICRO PROCESSOR
LED DISPLAY
RAM
36
18
TUNER
26
FM DATA RECEIVER
SERIAL NUMBER PROM
IR RECEIVER
40
12
16
34
RF INPUT
44
OPTIONAL RETURN PATH

FIG. 1

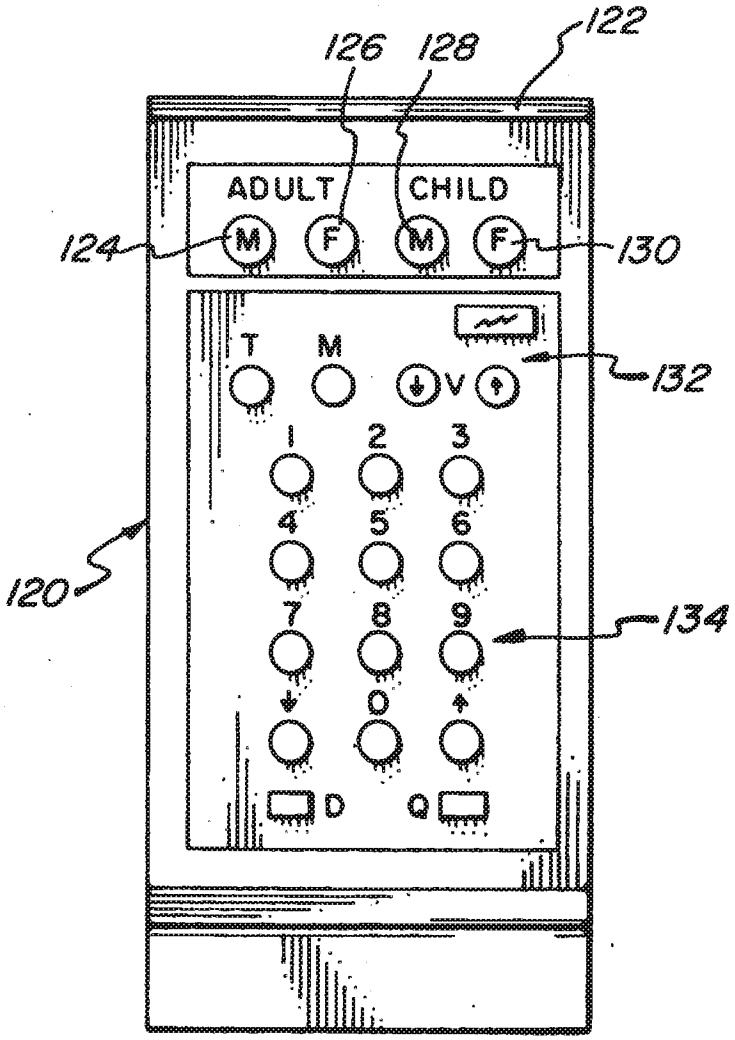
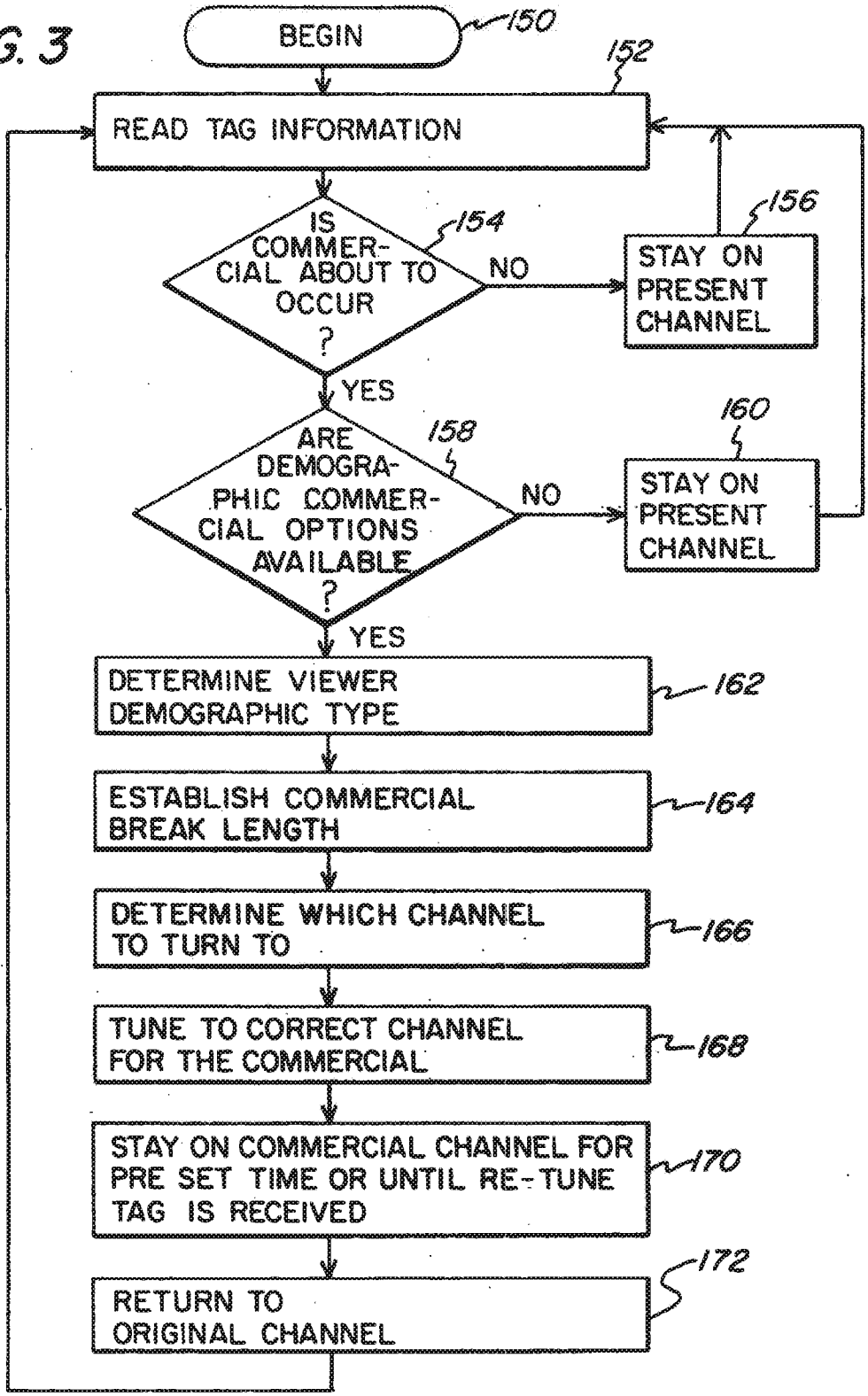

126
128
122
ADULT
CHILD
124
M
F
M
F
130
T
M
V
132
1
2
3
4
5
6
120
7
8
9
134
0
D
Q

FIG. 2

FIG. 3


BEGIN
150
152
READ TAG INFORMATION
IS COMMERCIAL ABOUT TO OCCUR ?
154
NO
156
STAY ON PRESENT CHANNEL
YES
ARE DEMOGRAPHIC COMMERCIAL OPTIONS AVAILABLE ?
158
NO
160
STAY ON PRESENT CHANNEL
YES
DETERMINE VIEWER DEMOGRAPHIC TYPE
162
ESTABLISH COMMERCIAL BREAK LENGTH
164
DETERMINE WHICH CHANNEL TO TURN TO
166
TUNE TO CORRECT CHANNEL FOR THE COMMERCIAL
168
STAY ON COMMERCIAL CHANNEL FOR PRE SET TIME OR UNTIL RE-TUNE TAG IS RECEIVED
170
RETURN TO ORIGINAL CHANNEL
172

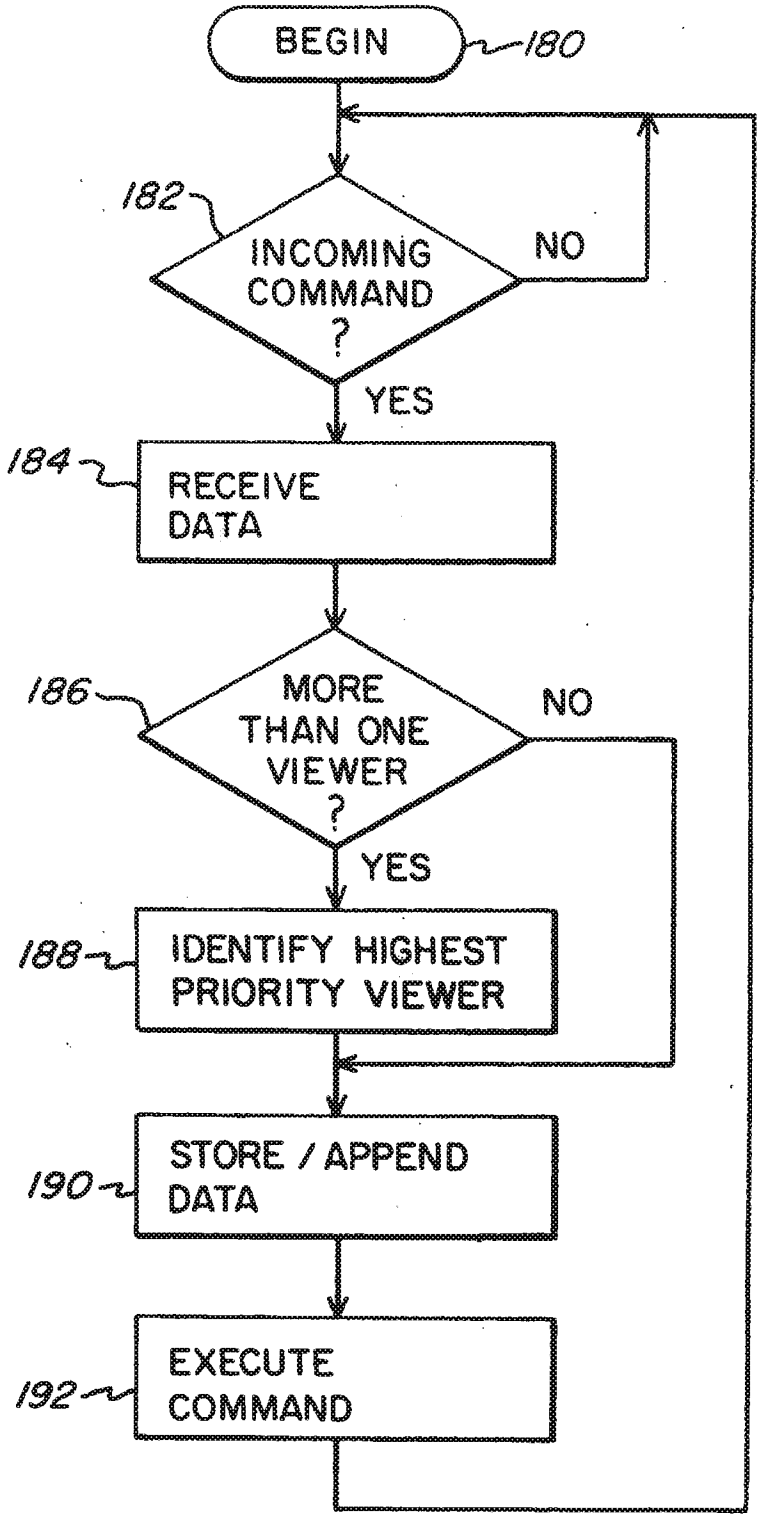

BEGIN
180
182
INCOMING COMMAND ?
NO
YES
184
RECEIVE DATA
186
MORE THAN ONE VIEWER ?
NO
YES
188
IDENTIFY HIGHEST PRIORITY VIEWER
190
STORE / APPEND DATA
192
EXECUTE COMMAND

FIG. 4

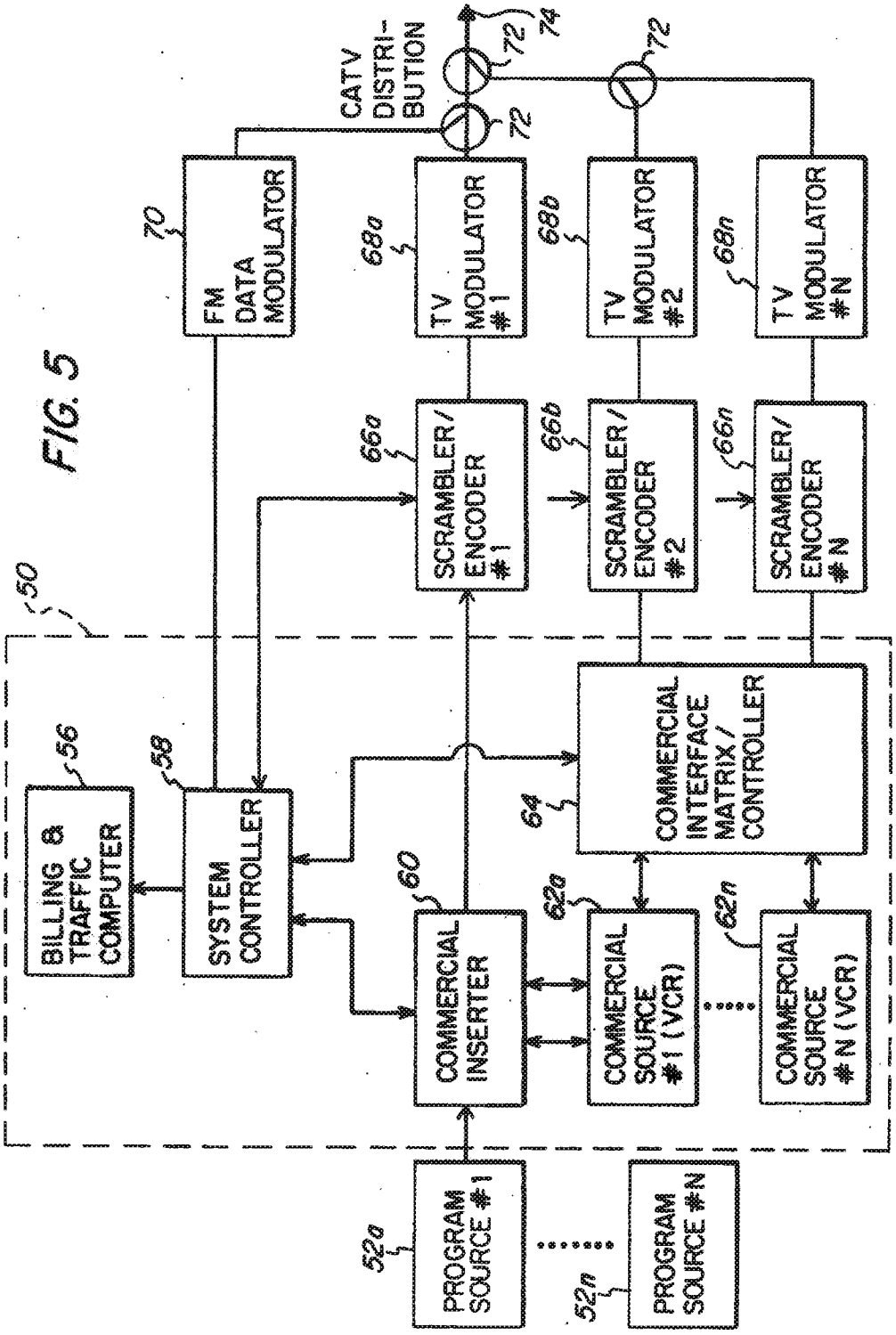

PROGRAM SOURCE #1
PROGRAM SOURCE #N
52a
52n
COMMERCIAL INSERTER
COMMERCIAL SOURCE #1 (VCR)
COMMERCIAL SOURCE #N (VCR)
60
62a
62n
COMMERCIAL INTERFACE MATRIX/ CONTROLLER
64
SYSTEM CONTROLLER
58
BILLING & TRAFFIC COMPUTER
56
50
SCRAMBLER/ ENCODER #1
SCRAMBLER/ ENCODER #2
SCRAMBLER/ ENCODER #N
66a
66b
66n
TV MODULATOR #1
TV MODULATOR #2
TV MODULATOR #N
68a
68b
68n
FM DATA MODULATOR
70
CATV DISTRI-BUTION
72
74

FIG. 5

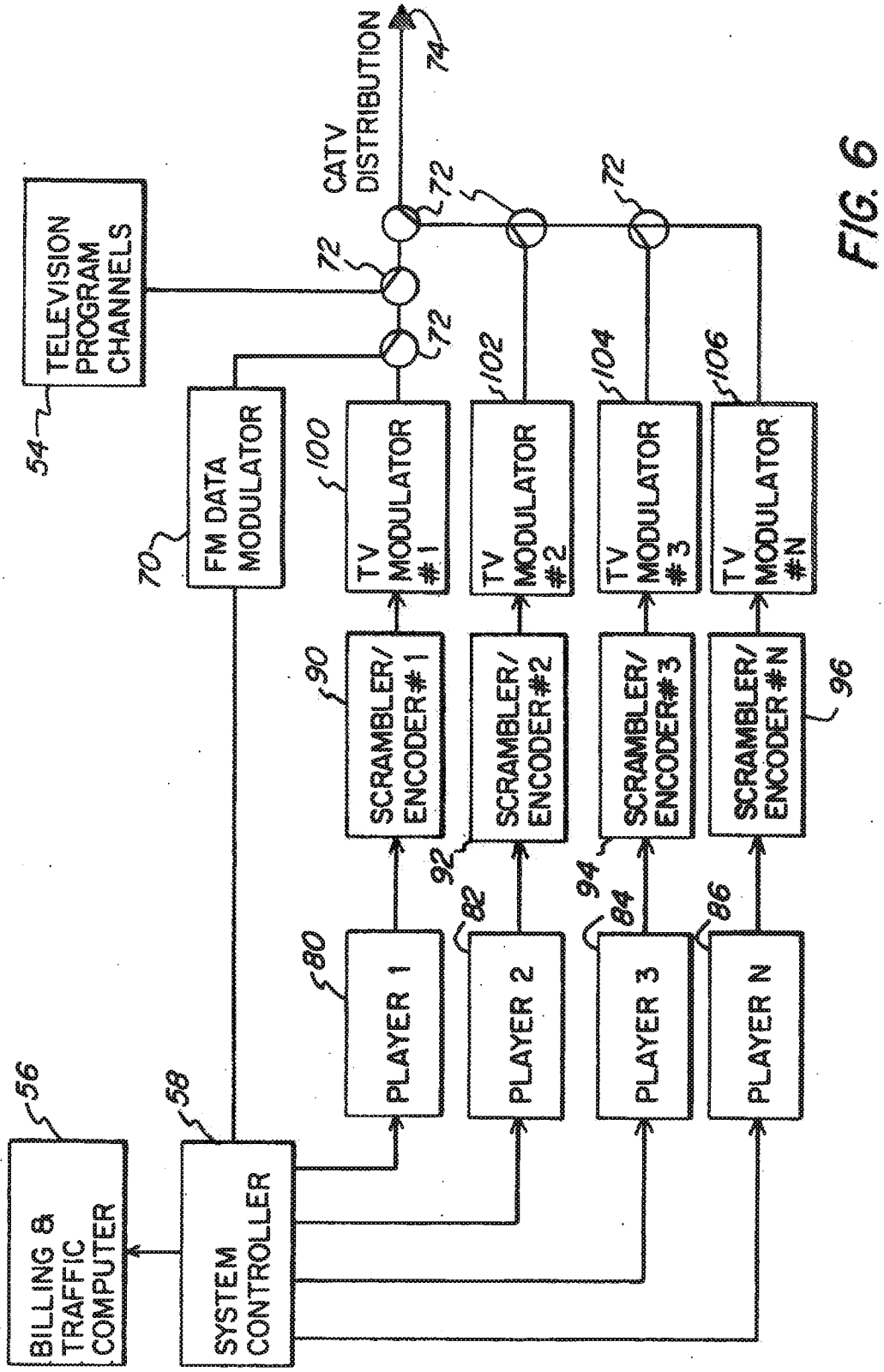

BILLING & TRAFFIC COMPUTER
56
SYSTEM CONTROLLER
58
TELEVISION PROGRAM CHANNELS
54
FM DATA MODULATOR
70
CATV DISTRIBUTION
74
72
72
72
TV MODULATOR #1
100
TV MODULATOR #2
102
TV MODULATOR #3
104
TV MODULATOR #N
106
SCRAMBLER/ ENCODER#1
90
SCRAMBLER/ ENCODER#2
92
SCRAMBLER/ ENCODER#3
94
SCRAMBLER/ ENCODER#N
96
PLAYER 1
80
PLAYER 2
82
PLAYER 3
84
PLAYER N
86

FIG. 6

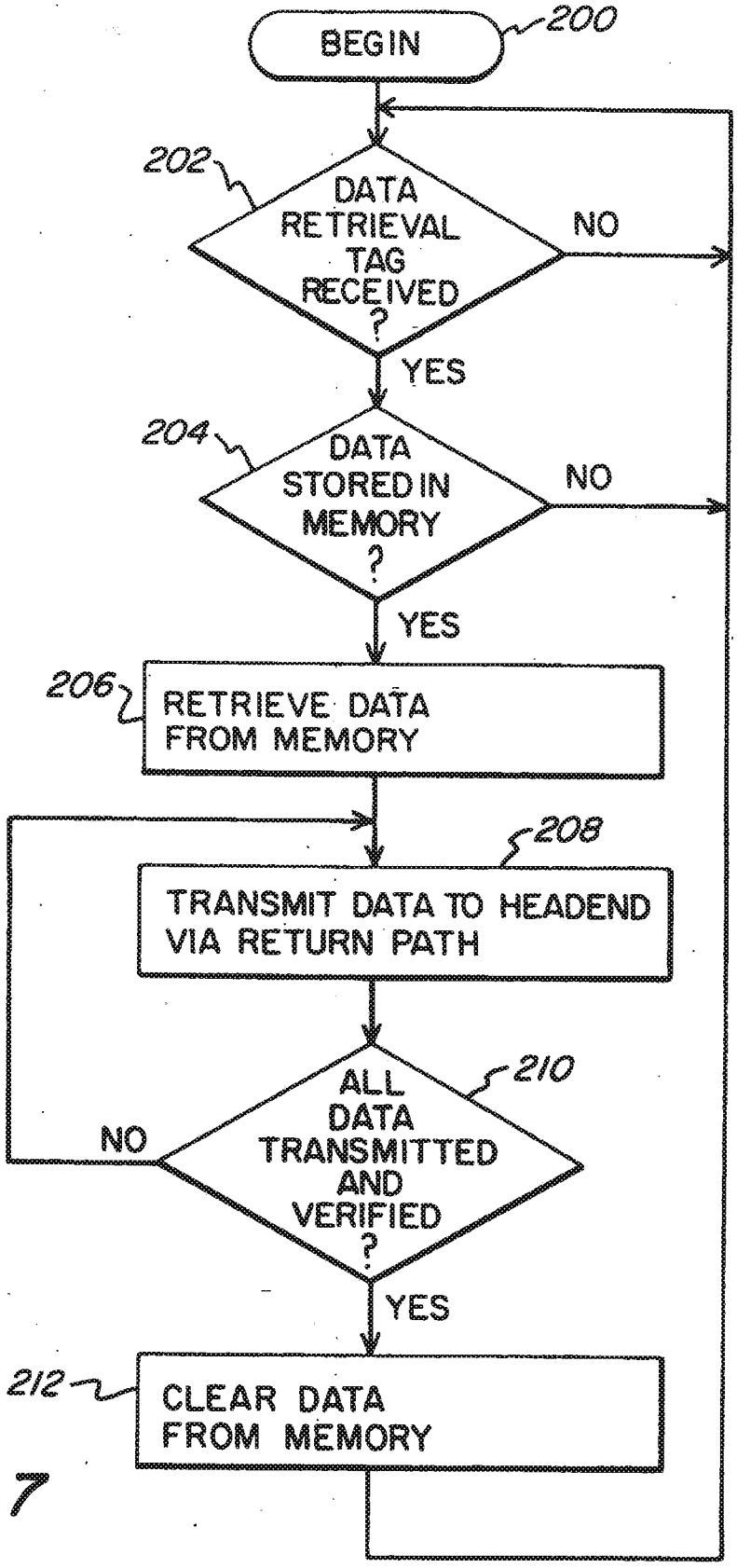

BEGIN
200
202
DATA RETRIEVAL TAG RECEIVED ?
NO
YES
204
DATA STORED IN MEMORY ?
NO
YES
206
RETRIEVE DATA FROM MEMORY
208
TRANSMIT DATA TO HEADEND VIA RETURN PATH
210
ALL DATA TRANSMITTED AND VERIFIED ?
NO
YES
212
CLEAR DATA FROM MEMORY

FIG. 7

METHOD AND APPARATUS FOR PROVIDING DEMOGRAPHICALLY TARGETED TELEVISION COMMERCIALS

BACKGROUND OF THE INVENTION

The present invention relates to cable television systems and apparatus, and more particularly to the provision of different commercial messages to different demographically targeted cable television audiences. Although the invention is described in the context of cable television systems, it will be appreciated that it has application in comparable systems, such as satellite broadcasting systems and the like.

Viewers of commercial television are well aware that a typical television channel contains television programs with periodic commercial message breaks. Advertisers sponsor television programs by purchasing space for their commercials during the broadcast of the program. Although different commercials are often run for the same television program in different geographic areas, there has been no way to target specific commercials to specific television viewers on a case-by-case basis.

It would be advantageous to provide a method and apparatus for targeting specific commercial advertisements to demographically selected audiences. Such a system would enable commercial advertisements to be matched to specific television viewers, thereby more efficiently utilizing advertising budgets. It would be further advantageous to maintain real-time records of demographic characteristics of particular television viewers and the programs they watch, for subsequent retrieval and analysis.

The present invention provides such a method and apparatus.

SUMMARY OF THE INVENTION

The present invention provides a cable television system or the like for broadcasting different commercial messages to different demographically targeted audiences. A headend transmits television signals. Means are provided for identifying demographic characteristics of a television viewer. Selection means, responsive to the identifying means, provide a particular commercial message transmitted from the headend based on the demographic characteristics.

Viewer demographic types can be determined in a variety of ways. In one approach, a user demographic key on a handheld remote control is actuated by the viewer before television channel selection is made. This demographic type is then stored in the memory of a cable television converter or the like. The converter will thereby know what demographic type is viewing a television program.

Alternate methods of determining individual viewer demographic types include household survey or diary information, known address/neighborhood locations or known ethnic locations. All of these approaches allow for demographic information to be programmed into a converter on an individual basis during installation of a cable television converter or, by known techniques from a cable system headend that transmits data to an addressable converter.

In one embodiment of the present invention, the headend transmits a first television channel comprising television programs with periodic commercial messages, and a second television channel comprising alternate commercial messages. The selection means provide a commercial message from the first or second channel depending on the demographic characteristics of a viewer. Such characteristics might include, for example, whether the viewer is male or female, and whether the viewer is an adult or a child.

Means are provided for determining when a commercial message break is about to occur, and the selection means are responsive thereto for providing an appropriate commercial message during the break. In a preferred embodiment, the headend transmits a plurality of alternate commercial message channels for use by the selection means. Thus, for example, a television program viewed by a child can have toy commercials, while the same program viewed by an adult can have commercials for items such as automobiles, air transportation services, and the like. In a more comprehensive system, the headend can transmit a plurality of television program channels each having periodic commercial message breaks, with each television program channel having a corresponding plurality of alternate commercial message channels associated therewith.

In order to provide a return to the television program at the termination of a commercial message break, a timer can be provided that allocates a specific time slot (e.g., 15 seconds, 30 seconds, 60 seconds) for commercial messages to be received. At the termination of the time slot, the system returns to the channel containing the television program. Other means, such as commercial message break start and stop data signals, can be provided to alert the selection means to switch from the television program channel to an appropriate commercial channel, and back. Such data signals can be transmitted by the headend as "tag information" on a separate data path in a conventional manner.

In order to accommodate a plurality of television viewers watching a television together, means are provided for prioritizing the demographic characteristics of a group of viewers. The selection means is responsive to the prioritizing means for providing a commercial message based on the prioritization.

In order to provide market research functions and enable accurate billing of advertisers for commercials presented to viewers, means are provided for storing data indicative of cable services selected by viewers and commercial messages provided by the selection means for subsequent retrieval and analysis by the headend.

The present invention also provides subscriber apparatus for use in receiving cable television services or the like. Means are provided for receiving television signals including a first television channel comprising television programs with periodic commercial message breaks and a plurality of additional television channels comprising commercial messages. Tuning means, coupled to the receiving means, provide a selected channel for viewing. Means are provided for identifying demographic characteristics of a television viewer. A determination is made as to when a commercial message break is about to occur on the first television channel, and selection means actuate the tuning means to provide a particular commercial message channel for viewing during a commercial message break, based on the viewer's demographic characteristics. Means are further provided for actuating the tuning means to return to the first television channel at the conclusion of a commercial message break.

A remote control is provided for use with a cable television converter, which comprises selector switches for enabling a user to remotely control various functions including channel selection. In accordance with the present invention, the remote control comprises means for enabling a user to input demographic data to the converter. Such means can comprise a plurality of switches for entering information indicative of the sex and age of the user.

In another embodiment, the present invention provides a cable television system or the like with the option of commercial free television programming. A headend transmits television signals, including a first television channel comprising television programs with periodic commercial messages and a second television channel comprising a non-commercial program (e.g., music, fine arts, or the like). Alternately, the second channel can provide another television program (e.g., a sports event) the viewer wants to watch intermittently during commercial breaks in the primary show being viewed. Means are provided for receiving the first channel from the headend, and determining when a commercial message break is about to occur on the first television channel. Means responsive to the determining means receive the second channel instead of the first channel during the duration of the commercial message break.

Headend apparatus is provided for broadcasting different commercial messages to different demographically targeted cable television audiences. Means are provided for transmitting a television signal containing television programs and periodic commercial message breaks on a first television channel on a cable distribution network. A library of recorded television commercials is provided for playback under the control of a system controller. Means concurrently transmit, on separate television channels on the cable distribution network, a plurality of different television commercials played back under the control of the system controller during a periodic commercial message break.

The headend apparatus can further comprise means for storing data indicative of demographic characteristics of a cable television subscriber. Means responsive to the stored data direct subscriber apparatus serving the subscriber to tune to a designated channel, during a periodic commercial message break, for receipt of a television commercial targeted to the subscriber. Means are provided for recording data indicative of commercials transmitted on the cable distribution network from the library, and for billing advertisers based on this data.

A method is provided for broadcasting different commercial messages to demographically different television audiences. A first channel is transmitted, containing television programs and periodic commercial messages. A second transmitted channel contains alternate commercial messages. Demographic characteristics of a viewer are identified, and commercial messages are selectively provided from the first or second channel, depending upon the demographic characteristics. A plurality of channels containing alternate commercial messages may be transmitted, wherein commercial messages are provided selectively from the first, second or an alternate channel depending on the demographic characteristics identified. The demographic data can be received from the television viewer, and prioritized where a plurality of television viewers are watching a television together.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a cable television converter for use in connection with the present invention;

FIG. 2 is a plan view of a handheld remote control that a viewer can use to input demographic information;

FIG. 3 is a flowchart of a software routine used by the converter of FIG. 1 in connection with the present invention;

FIG. 4 is a flowchart of a routine used by the converter of FIG. 1 for storing command and demographic data entered by a viewer and prioritizing demographic data of a plurality of viewers watching a television program together;

FIG. 5 is a block diagram of headend apparatus in accordance with the present invention;

FIG. 6 is a block diagram showing an alternate embodiment of headend apparatus in accordance with the present invention; and

FIG. 7 is a block diagram of a routine used by the converter of FIG. 1 to retrieve stored data and transmit it to the headend.

DETAILED DESCRIPTION OF THE INVENTION

The present invention allows the targeting of particular commercial advertisements to television viewers having particular demographic characteristics, and the subsequent retrieval of market research data identifying the programs selected and commercials viewed by particular demographic types. The invention is disclosed in connection with a cable television system. It should be appreciated, however, that the invention is equally applicable to other television broadcast systems as will be apparent to those skilled in the art.

In accordance with the invention, a cable television converter tunes automatically to a predefined commercial channel when a commercial message break is about to occur in a television program being viewed. The predefined commercial channel contains commercials targeted to the viewer demographic type. The tuning from the program channel to the commercial channel is only minimally noticeable by the viewer. For example, the tuning can occur during the vertical blanking interval of the television program signal. The implementation of control functions during the vertical blanking interval is well known in the art, and circuitry for effecting a tuning change during the vertical blanking interval will be apparent to those skilled in the art. By enabling different converters to tune to different commercial channels, one viewer demographic type using one converter might see a commercial for automobiles while another viewer using a similar converter could see an advertisement for toys during the same commercial break.

FIG. 1 illustrates, in block diagram form, a converter 10 used in connection with the present invention. An RF input signal, comprising a plurality of television program channels and commercial message channels, is input at terminal 12 from a cable system headend. The input signal is coupled, via splitter 16, to a tuner 18 that is used to tune to a particular television program channel or commercial channel under the direction of microprocessor 30. The output of tuner 18 is coupled via splitter 20 to a conventional descrambler 24, which outputs television program signals to a viewer's television set (or other video appliance, such as a VCR) via terminal 14. An AM data receiver 22 receives "tag

information" carried on a particular television channel and inputs the information to microprocessor 30. FM data receiver 26 receives other information from the headend (i.e., descrambler authorization data) for input to microprocessor 30. The use of AM and FM data receivers in cable television converters for retrieving tag information and addressable data is well known.

Operational software for converter 10 is contained in ROM 32. Existing cable television converters, such as the DP5/DPV5/DPBB converters and the DP7 family of converters manufactured by the Jerrold Division of General Instrument Corporation can be upgraded to implement the present invention by interchanging the ROM chip contained in the converter with a new ROM device containing additional software.

A serial number PROM 34 in converter 10 contains a unique code identifying the converter to the headend, enabling the converter to be addressed on an individual basis. RAM 36 is the operating memory for microprocessor 30, and in accordance with the present invention stores data indicative of demographic characteristics of a viewer or viewers using the converter at any given time. RAM 36 may also store data indicative of the television channels or other cable services selected by particular demographic types. This data can be appended with date and time information by microprocessor 30, to enable subsequent cross-referencing of channels selected by viewers to the programs shown on the channel at the time of selection.

LED display 38 outputs the television channel number to which the converter is tuned by a viewer. IR receiver 40 receives data transmitted by a handheld remote control for input to microprocessor 30. Keypad 42 enables users to input channel selection and other information to the converter directly without the use of a handheld remote control.

A remote control 120 for use with converter 10 is illustrated in FIG. 2. Data are transmitted from the front end 122 of remote control 120 using an infrared or equivalent remote data path. A plurality of conventional function buttons 132 and channel selection buttons 134 are provided. In accordance with the present invention, a plurality of switches 124, 126, 128, 130 is provided to enable a user to input demographic data to converter 10. For example, switches 124 and 126 can be provided to indicate that the viewer is an adult male or female, respectively. Switches 128 and 130 can be provided to indicate that the viewer is a male or female child, respectively. Other demographic information can alternately be provided via switches 124–130, or by the provision of additional demographic switches on remote control 120. Equivalent switches can also be provided on the converter itself, as part of keypad 42. In an alternate embodiment, a user code is entered on the numeric keys of the remote control or converter to identify the demographic type of the viewer before any commands are executed. Use of a user code would expand the number of demographic types allowable, but may require additional keys to be actuated to initiate a converter response.

In operation, a viewer is required to press a demographic key on the remote control 120 (or on keypad 42) before any other key is depressed to select a channel or other converter function. The demographic data (and any other relevant data, such as data indicative of the converter function selected) are then stored in RAM 36 so that the converter knows what demographic type is watching the television associated with the converter at any given instant. This implementation provides a dynamic system where the viewer demographics can change at any time. In addition, multiple viewer data and/or demographic types can be entered and stored in the converter. A "delete" button can be provided to tell the system that a particular demographic type has left the viewing area. Prioritization of multiple viewers for use in selecting appropriate commercials is handled as described below in connection with FIG. 4.

Alternate methods of identifying viewer demographic types include a passive approach, relying upon image recognition technology to determine what viewer or viewers are watching television at any given time. Demographic types can also be identified using household survey or diary information, known address-/neighborhood locations or known ethnic locations. Information determined by such techniques is transferred into RAM 36 of converter 10 on an individual basis by a technician installing the converter, or via a communication from the cable system headend which addresses converter 10, via FM data receiver 26, to download the demographic data. This approach allows the headend to update and modify changes in household demographics for particular subscribers.

A headend in accordance with the present invention transmits television program channels to converter 10 together with separate channels containing commercial messages (i.e., advertisements). Information alerting the converter as to when a commercial message break is about to occur during a television program, and identifying the channels containing commercials for different demographic audiences, is transmitted by the headend in the form of tag information on the particular television program channel to which the converter is tuned. The tag information is detected by AM data receiver 22 and input to microprocessor 30, which forces tuner 18 to tune in the appropriate commercial message channel at the appropriate time. The AM tag data detected by receiver 22 is carried on the audio portion of the television program signal in a conventional manner. Alternately, the tag data can be included in the vertical blanking interval using known techniques to alert converter 10 (via microprocessor 30) that a commercial break is about to occur.

Once converter 10 has been alerted that a commercial message break is imminent, it identifies the demographic characteristics of the current viewer from data stored in RAM 36. The converter software stored in ROM 32 then initiates an automatic channel change during a vertical blanking interval to the specific commercial message channel to which the demographic characteristics correspond. This channel is maintained for either a pre-established fixed time period (e.g., 15, 30, 45 seconds, etc.) by a timer operatively associated with microprocessor 30, or until a "return to original channel" instruction is detected by the converter through tag data transmitted by the headend. After the commercial break, the converter returns back to the original television program channel during a vertical blanking interval. Switching back and forth between television program and commercial message channels during the vertical blanking interval minimizes any visible interruption to the television viewer. The software for accomplishing the retuning of tuner 18 contains program instructions that will be apparent to those skilled in the art.

In the event separate commercial message channels are not being transmitted by the headend, or if commercials already included on the television program channel being viewed are appropriate for the viewer, the converter maintains the current television program channel during commercial breaks and no automatic tuning to alternate commercial message channels occurs. The system of the present invention is compatible with existing systems, and enables "cable-ready" televisions viewing cable television channels directly (without a converter) to receive the commercials carried on the television program channel being viewed.

A flowchart illustrating the operation of the converter software contained in ROM 32 in a preferred embodiment is provided in FIG. 3. The software routine begins at box 150, which passes control to box 152 where tag information transmitted by the system headend is read. The tag information defines if and when a commercial is about to occur, how long it will last, and which channel the converter should tune to given the viewer demographic type. If the tag information does not indicate that a commercial is about to occur, as determined at box 154, the converter stays tuned to the present television program channel, as indicated at box 156. Otherwise, control passes to box 158 where a determination is made as to whether demographic commercial options are available. If not, the converter remains tuned to the present channel as indicated at box 160.

If the converter contains data indicative of a viewer's demographic characteristics, and the headend is providing a channel for commercials targeted to such a viewer, the targeted commercials will be provided to the viewer. At box 162, the viewer demographic type stored in RAM 36 is determined. At box 164, the length of the impending commercial message break is determined from the tag information transmitted by the headend. At box 166, the converter determines which channel to tune to in order to receive the targeted commercials. The channel information is either defined by the tag information received from the headend, or has previously been stored in converter memory 36. Then, at box 168, the converter tunes to the correct channel for the commercials to be received. This is accomplished by a signal from microprocessor 30, that directs tuner 18 to tune in the appropriate commercial message channel.

Tuner 18 remains tuned to the commercial message channel for a preset length of time (i.e., the length of the commercial break) or until new tag information is received from the headend directing the converter to retune to the original television program channel. The return to the original channel is effected at box 172. Control then returns to box 152 where the process repeats.

In the event that a group of television viewers are watching a television together, and more than one viewer demographic type is present, a hierarchy/priority decision is made by the converter software to determine the dominant demographic type present. The prioritization method can be based, for example, upon a weighted average of all the viewers present. Alternately, the viewer who initiated the present channel decision, or the person who makes household buying decisions can be given priority. The flowchart of a routine for receiving data input by a viewer (including demographic data), dealing with a plurality of viewers, and storing said data for possible later retrieval and analysis is provided in FIG. 4.

The routine of FIG. 4 commences at box 180, and control is passed to box 182 where a determination is made as to whether a command initiated by a viewer is being input to the converter. Once an incoming command is detected (e.g., from a viewer's remote control), control passes to box 184 where data indicative of selections made by a viewer, including demographic data pertaining to the viewer(s), are received. At box 186, a determination is made as to whether demographic data were received for more than one viewer. If so, the highest priority viewer is identified at box 188. The viewer demographic type of the highest priority viewer is stored in RAM 36, as indicated at box 190. Then, at box 192, the actual command (e.g., change of channel) entered by the viewer is executed. Control then returns to box 182 where the process repeats.

In the event the cable television system operator wants to provide market research data to advertisers concerning, e.g., demographic information, channels/programs viewed, pay-per-view purchases, etc., RAM 36 will also store cumulative data indicative of the selections made by users via the remote control or converter keyboard. As indicated at box 190, microprocessor 30 will append this data with the date and time of the selections so that the actual programs or other services selected can be identified. The date and time information can be received by microprocessor 30 from the headend via FM data receiver 26. Information concerning other converter functions, such as the position of A/B switches for bypassing the converter or viewing off-air programs, can also be determined and stored. A routine for the subsequent transmission of this market research data to the headend is shown in FIG. 7.

The routine of FIG. 7 commences at box 200, and at box 202 a determination is made as to whether the converter 10 (FIG. 1) has received a data retrieval tag instruction from the headend. Such an instruction would be sent down the cable and received by FM data receiver 26. Upon recognition of a data retrieval tag in the FM data stream addressed to the particular converter, microprocessor 30 determines whether any pertinent data are stored in RAM 36, as indicated at box 204. If not, control returns to box 202 until a data retrieval tag instruction is received and relevant data are found in RAM 36.

If relevant market research data have been stored in RAM 36, control passes from box 204 to box 206 where the data are retrieved from RAM 36. As indicated at box 208, the data are then transmitted to the headend via return path 44, which may be any conventional return path well known in the art. For example, if a telephone return path is used, return path 44 will include a modem to modulate the data for transmission over a telephone line. In a two-way cable system, an RF return path may be used. At box 210, a determination is made as to whether all of the pertinent market research data have been transmitted to the headend and whether the transmission has been verified. If not, the data transmission repeats until it is complete. At box 212, the accumulated market research data are cleared from RAM 36, although the current viewer demographic data will remain so that a user will not have to re-enter this information after the market research data have been retrieved. Control then returns to box 202 to await the next request by the headend for the retrieval of market research data from the converter.

One embodiment of a cable television system headend that can be used to implement the present inven-

tion is shown in block diagram form in FIG. 5. The components for handling commercial message sequencing and insertion are depicted in box 50. In this embodiment, the cable system operator, who controls the headend, is provided with the capability to insert commercials in the commercial break portions of programs carried on the main television program channel, and also for providing a plurality of alternate commercial channels targeted to different demographically defined audiences.

A system controller 58, which comprises a computer such as a personal computer or mini computer, provides overall control of a commercial inserter 60, commercial sources 62*a–n*, and a commercial interface matrix/controller 64. Controller 58 also provides billing and traffic data to a billing and traffic computer 56 that is shared with other conventional headend components (not shown) for billing subscribers and advertisers, and managing the cable television services provided.

Commercial inserter 60 receives commercials from one or more commercial sources 62*a–n* which may, for example, comprise VCRs, video disc players, or the like, containing recorded commercial messages. The commercial inserter can serve a plurality of television program channels, each fed by a respective program source 52*a–n*. Each program source carries television programs having periodic commercial message breaks. Commercials are inserted during the commercial message breaks by commercial inserter 60, and output on the same television channel that carries the program source via a scrambler/encoder 66*a* and television modulator 68*a* for each television program channel. The scrambler/encoder scrambles premium program signals as necessary, and encodes the program signal with the tag information necessary to identify the commencement of a commercial break, etc. The channel signal output from television modulator 68*a* is coupled to the cable television distribution system at terminal 74 via a coupler 72, in a conventional manner.

Commercial interface matrix/controller 64 enables the cable system operator to provide a plurality of alternate commercial message channels, each of which is scrambled and encoded as necessary by scrambler/encoders 66*b–n*, which in turn output the commercial message channels to television modulators 68*b–n*. Each television modulator outputs the commercial messages input to it on a different channel. The channels are coupled to the cable television distribution network via couplers 72 for output on terminal 74.

The individual commercials contained in an alternate commercial message channel are retrieved by commercial interface matrix/controller 64 from commercial sources 62*a–n*. Where, for example, an alternate commercial message channel is provided for children, commercials for various toys can be retrieved by controller 64 from commercial sources 62*a–n*.

System controller 58 provides overall control of the headend apparatus. For example, it controls the state of commercial inserter 60 to select between a television program from program source 52*a* and a commercial message from commercial sources 62*a–n*. Commercials from sources 62*a–n* are available on a time shared basis, under the control of software contained in the system controller. In this manner, for example, the same commercial can be provided on the main television program channel (via commercial inserter 60) and on an alternate commercial message channel (via commercial interface matrix/controller 64) at different time slots within the same commercial break. For example, the same commercial can be run on one channel during the first 15 seconds of a 45 second commercial break, and on another channel during the last 15 seconds of the same commercial break. The ordering of various different commercials within a commercial break, and the selection of those commercials is ultimately controlled by system controller 58 in accordance with sequencing rules established by the cable system operator.

As noted above, tag information necessary, e.g., for the converter to determine that a commercial break is about to occur on a given channel, is "encoded" on television channels via scrambler encoders 66*a–n*. This information is included either as AM data in the audio portion of the television signal, or as vertical blanking interval data. Specific tag data and timing of such data are relayed to scrambler/encoders 66*a–n* via system controller 58. The tag information can be encoded with or without signal scrambling.

An FM data modulator 70 is provided to enable the headend to download information, such as demographic information, to subscriber converters. This information can be transmitted on an individual basis where it is addressed to a particular converter, globally, or by groups of converters assigned to subscribers having similar demographic characteristics.

Billing and traffic computer 56 allows for accurate commercial tracking and advertiser billing. This computer, through a clock in system controller 58, records when various commercials were run, with data indicative of the channel on which each commercial was run and for how long. Feedback to advertisers can also be provided on who and how many people viewed a particular commercial, through the use of an optional return path 44 provided in converter 10 (see FIG. 1). Optional return path 44 comprises an output from microprocessor 30 that communicates with the headend via the cable television network (where a two-way system is provided) or on another return path, such as a telephone line. Return paths for providing two-way communication between cable television headends and subscriber converters are well known in the art.

FIG. 6 illustrates an alternate headend embodiment, wherein commercial interface matrix/controller 64 is eliminated. A plurality of television program channels 54 are coupled, via a coupler 72, for output on the cable television distribution network at terminal 74. The television program channels contain television programs and periodic commercial messages. Alternate commercial messages are provided on a plurality of commercial message channels that are also coupled to the cable television distribution network. Each alternate commercial message channel receives commercials from an associated commercial player 80, 82, 84, 86 controlled by system controller 58. The commercial players can comprise, for example, video disc players equipped with interchangeable video discs each containing a plurality of commercials. Each player can retrieve and play back any of the commercials from a video disc on a random access basis. The system operator programs a set of commercials for playback on each commercial message channel in any order desired. In practice, the system operator will create sets of commercials to fill commercial breaks of different time periods and grouped to target different demographic audiences.

Television signals containing the commercials are output from each player to scrambler/encoders 90, 92, 94, 96, respectively. The scrambled and/or encoded

commercial signals are input to television modulators 100, 102, 104, 106, respectively, where the commercials from each player are output on a different television channel. These television channels form the alternate commercial message channels retrieved by subscriber converters as described above. The commercial message channels are coupled to the cable television distribution network by couplers 72.

In another embodiment of the present invention, a "commercial killer" option can be provided. In this embodiment, one of players 80, 82, 84, 86 will play a non-commercial program (e.g., music, fine arts, etc.) instead of commercials. A subscriber converter can be programmed to tune to the non-commercial channel during all commercial breaks, and then return to the regular television program channel upon the completion of each commercial break. With this feature, subscribers can eliminate all commercial messages from their television viewing. Alternately, a subscriber converter can be programmed to tune to another program channel (selected by the viewer) during commercial breaks occurring on the primary channel being viewed. Thus, for example, a viewer can watch portions of a second sports event during the commercial breaks in an event of primary interest.

Demographic programming is also available using the apparatus of the present invention, allowing total program material (including programs and commercials) to be automatically selected by the converter based on a viewer's demographics. A viewer would tune to a certain channel number, and all programming for the viewer would be provided by the converter automatically tuning to program and commercial channels according to demographics or pre-established viewer preferences.

It will now be appreciated that the present invention provides a system, apparatus, and method for broadcasting different commercial messages to different demographically targeted audiences. Although the invention has been described in connection with various preferred embodiments, those skilled in the art will recognize that various modifications may be made thereto. For example, the invention is not limited to use in a cable television system, and can be utilized in connection with other television transmission schemes. It is intended that the following claim language be read in its broad sense to cover all such equivalent schemes.

I claim:

1. Apparatus for use in receiving television services, comprising:

means for receiving television signals including a first television channel comprising television programs with periodic commercial message breaks and a plurality of additional television channels comprising commercial messages;

tuning means coupled to said receiving means for providing a selected channel for viewing;

means for identifying demographic characteristics of a television viewer;

means for determining when a commercial message break is about to occur on said first television channel;

means for prioritizing the demographic characteristics of a plurality of television viewers currently watching a television together; and

selection means, responsive to said determining means and said prioritizing means, for actuating the tuning means to provide a particular commercial message channel for viewing during a commercial message break, based on said prioritization of demographic characteristics.

2. Apparatus in accordance with claim 1 further comprising:

remote control means for enabling a viewer to transmit demographic data to said identifying means.

3. Apparatus in accordance with claim 1 further comprising:

means for storing data indicative of commercial messages provided by said selection means for subsequent retrieval and analysis by a headend.

4. Apparatus in accordance with claim 1 further comprising:

means for enabling a viewer to input demographic data to said identifying means.

5. Apparatus in accordance with claim 1 further comprising:

means for actuating said tuning means to return to said first television channel at the conclusion of a commercial message break in the event said selection means has provided a commercial message from a channel other than said first television channel during the break.

6. A television system for providing substitute television programming during commercial breaks in a primary program, comprising:

a headend for transmitting television signals, including a first television channel comprising television programs with periodic commercial messages and a second television channel comprising another viewer selected backup program;

means for receiving said first channel from said headend;

means for determining when a commercial message break is about to occur on said first television channel; and

means responsive to said determining means for receiving said second channel instead of said first channel during the duration of the commercial message break.

7. Headend apparatus for broadcasting different commercial messages to different demographically targeted television audiences, comprising:

means for transmitting a television signal containing television programs and periodic commercial message breaks on a first television channel on a television signal distribution network;

a library of recorded television commercial for playback under the control of a system controller;

means for concurrently transmitting, on separate television channels on said distribution network, a plurality of different television commercials played back under the control of said system controller during a periodic commercial message break for selective receipt of different commercials by a universe of viewers;

means for recording data indicative of the number of viewers that are provided with a given commercial transmitted on said distribution network from said library; and

means responsive to said recording means for billing an advertiser based on said data.

8. Headend apparatus in accordance with claim 7, further comprising:

means for storing data indicative of demographic characteristics of one of said viewers; and

means, responsive to data stored in said storing means, for directing viewer apparatus serving said one of said viewers to tune to a designated channel during said periodic commercial message break for receipt of one of said plurality of different television commercials targeted to the viewer.

9. A system for automatically selecting television programs and commercials for a viewer, based on data pertaining the viewer, comprising:

means for storing data indicative of predetermined characteristics of said viewer;

means, responsive to said stored data, for causing a television signal receiver to select from a plurality of programs a television program targeted to viewers having said characteristics; and

means, responsive to said stored data during a commercial message break of said selected television program, for directing said television signal receiver to select, from a plurality of commercials, a television commercial targeted to viewers having said characteristics.

10. Apparatus in accordance with claim 5 wherein said actuating means comprises:

a timer for actuating the return to said first television channel a predetermined time period after a commercial message break has commenced.

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